

# MASTER HEALTH AND SAFETY PLAN

ENVIRONMENTAL SERVICES
JEFFERSON PROCESSING SITE
TASK ORDER NO. 42
4243 COUNTY ROAD 74
JEFFERSON COUNTY
MINGO JUNCTION, OHIO

Prepared for:

U.S. Environmental Protection Agency Region 5 77 West Jackson Boulevard Chicago, IL 60604

Prepared by:

Earth Tech, Inc. 5555 Glenwood Hills Parkway, SE Grand Rapids, MI 49588-0874

July 2000

41637

## 2.0 SCOPE OF WORK

## 2.1 GENERAL

Earth Tech will conduct environmental services at the Jefferson Processing site. Work will be performed in accordance with the applicable Statement of Work (SOW) and associated Work Plans developed for the Jefferson Processing site Task Order (TO) 0042.

Environmental services at the Jefferson Processing site include, but are not limited to, the following tasks:

- Provide site security measures;
- Collect bulk samples of soils, solids found in J-1 and J-2, and other miscellaneous materials;
- Perform hot-work cutting to access locked areas;
- Inactive electrical component assessments (transformers, capacitors, etc.);
- Sample, drain, flush and containerize polychlorinated biphenyl-containing liquids/oils from inactive electrical components;
- Perform personal and area air monitoring;
- Ship bulk samples and air monitoring media to contract laboratories for analysis and interpret results upon receipt.

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Project Number: 41637.01

Prepared by:

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Health and Safety Professional

7-28-00

Date

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Health and Safety Manager

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Date

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## **DISCLAIMER**

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This Health and Safety Plan (HASP) was prepared to be used by employees performing a specific, limited scope of work. It was prepared based on the best available information regarding the physical and chemical hazards known or suspected to be present on the project site. Of course, it is not possible to discover, evaluate, and protect in advance against all possible hazards, which may be encountered during the completion of this project. However, adherence to the requirements of the HASP will significantly reduce the potential for occupational injury.

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RECORD OF AMENDMENTS

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## **LIST OF ACRONYMS**

ACGIH American Conference of Governmental Industrial Hygienists

ANSI American National Standards Institute

Btu/lb British thermal unit per pound

BWI Body water loss °C Degrees Celsius

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act

CFR Code of Federal Regulations
CIH Certified Industrial Hygienist
CNS Central nervous system
COO Chief Operating Officer

CPR Cardiopulmonary resuscitation
CSP Certified Safety Professional

eV Electron Volts

\*F Degrees Fahrenheit
 HASP Health and Safety Plan
 HAZCOM Hazard Communication

HAZWOPER Hazardous Waste Operations and Emergency Response

HMIS Hazardous Materials Information System

HR Heart rate

**HSM** Health and Safety Manager

IARC International Agency for Research on Cancer

LEL Lower explosive limit

mg/m³ Milligrams per cubic meter

mg/kg Milligrams per kilogram

mg/L Milligrams per liter

MSDS Material Safety Data Sheet

NIOSH National Institute for Occupational Safety and Health

NA Not Applicable NK Not Known

NPL National Priorities List

OHST Occupational Health and Safety Technologist

OSC On-Scene Coordinator

OSHA Occupational Safety and Health Administration

OT Oral temperature

PEL Permissible Exposure Limit
PPE Personal protective equipment

PPM Parts per million
PVC Polyvinyl chloride

RCRA Resource, Conservation and Recovery Act

RM Response Manager
R<sub>x</sub> Optical correction

4.414

SARA Superfund Amendments and Reauthorization Act

SCBA Self-Contained Breathing Apparatus

**SOP** Standard Operating Procedure

SSO Site Safety Officer

START Superfund Technical Assessment and Response Team

STEL Short Term Exposure Limit

μg/L Micrograms per Liter
UEL Upper explosive limit

U.S. FPA United States Environmental Protection Agency

VOC Volatile organic compound

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## 1.0 INTRODUCTION

This Health and Safety Plan (HASP) provides a general description of the levels of personal protection and safe operating guidelines expected of each employee or subcontractor associated with the environmental services being conducted at the Jefferson Processing site, located on County Road 74 (Gould Road) in Mingo Junction, Jefferson County, Ohio (see Figures 1 and 2). Site-specific Health and Safety Supplements will be generated as necessary to address any additional delivery/task orders associated with this program, and will require acknowledgment in writing on their respective signature pages. Once generated, each Supplement will be inserted as an appendix, documented on the HASP Record of Amendments, and reviewed by field personnel prior to the start of applicable work activities.

#### 1.1 GENERAL

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The provisions of this HASP are mandatory for all personnel engaged in fieldwork associated with the environmental services being conducted at the Jefferson Processing site. A copy of this HASP and any applicable HASP Supplements shall be maintained on site and available for review at all times. Recordkeeping will be maintained in accordance with this HASP and Standard Operating Procedures (SOPs). See Appendix A for applicable SOPs. In the event of a conflict between this HASP and federal, state, and local regulations or the Health and Safety SOPs, workers shall follow the more stringent, more protective requirements.

## 1.2 POLICY STATEMENT

It is the site policy to provide a safe and healthy work environment for all employees. No phase of operations or administration is of greater importance than injury and illness prevention. Safety takes precedence over expediency or shortcuts. Every accident and every injury is avoidable. We will take every reasonable step to reduce the possibility of injury, illness, or accident.

This HASP and its appendices present procedures for the Jefferson Processing Project. The practices and procedures presented in this HASP and any supplemental documents associated with this plan are binding on employees while engaged in work. In addition, all site visitors shall abide by these procedures. Operational change to this plan and supplements that could affect the health or safety of personnel, the community, or the environment will not be made without prior approval of the On-Scene Coordinator (OSC), the Superfund Technical Assessment and Response Team (START), the Response Manager (RM), and the Health and Safety Manager (HSM). This HASP is based on federal and state safety and health regulations.

#### 1.3 SITE INFORMATION

This section provides a general description and historical information associated with the Jefferson County site.

#### 1.3.1 LOCATION

The Jefferson Processing site is located on County Road 74 (Gould Road), Mingo Junction, Jefferson County, Ohio. The site is located 4 miles south of Steubenville, Ohio, on the flood plain of Cross Creek. The site is bordered on the east and south sides by Cross Creek at Gould Road and on the west by Cross Creek at Sheeprock Road. The site is bordered on the north by dense woods.

#### 1.3.2 BACKGROUND/HISTORY

The site is comprised of 61 acres which includes several structures such as smaller buildings, cooling towers, a pump building (Pumphouse), an electrical substation, a laboratory, two larger furnace/processing buildings (Plant J-1 and Plant J-2), several settling ponds and numerous uncovered slag and baghouse dust waste-piles. The site is situated in a mixed rural and industrial area.

The site was established in 1958 by Vanadium Corporation of America (Vanadium) and included a 36-acre ferro-alloys production facility. Vanadium merged with Foote Mineral Company (Foote) in the 1960s. In the 1970s, Foote sold the production facility to Satralloy, Inc. (Satralloy). Vanadium Foote, and Satralloy used chrome ore which was shipped to the site to manufacture ferro-alloys. During the ore smelting and refining processes, large quantities of slag were generated as byproducts. Background information suggests that large quantities of slag and baghouse dust waste were generated and stockpiled without covers, on the property in areas such as the top of the ridge. In most cases, the stockpiles were placed on unlined surfaces. In 1982, Satralloy shut down the furnaces, which halted ferro-alloy production. In the mid-1980s, Satralloy changed its name to Satra Concentrates, Inc. (Satra). At that time, usable chromium was recovered from the piles of low-carbon slag wastes on site through a water concentration process. Several violations were noted during a 1988 Polychlorinated Biphenyls (PCBs) Compliance Inspection conducted by OEPA at the facility. The findings of this inspection lead to Consent Agreement and Final Orders that were issued to Satralloy, Inc. in 1990.

In December 1991, E & E completed a Site Assessment Report under TDD number 05-9110-014. PRC, under contract with U.S. EPA, issued a Screening Site Inspection Report in December 1992 under Contract number 68-W8-0084 and Work Assignment number 29-5JZZ.

The property was purchased by Catherine Glorious at a sheriff's auction in June 1994. Reportedly, Satra was then evicted from the property. Ms. Glorious began conducting business at the facility under the company name of Jefferson Processing. The slag at the facility was reclaimed for resale. Sometime after June 1994, approximately 75,000 tons of chromite ore, which had been stockpiled at the facility for the General Services Administration were removed from the site. It was also reported that vandals had removed equipment and transformers from the site since Ms. Glorious had purchased the property. Since the June 1994 purchase of the property by Ms. Glorious, the facility has been operated by Mr. Gary Smith of Argo Sales Company, Inc. Operations under Mr. Smith included general maintenance and clean-up of abandoned site structures as well as crushing and screening high-carbon slag for the purpose of selling it as road aggregate.

The presence of several PCB transformers and capacitors was noted by OEPA during site visits conducted prior to the May 1997 PCB Compliance Inspection.

#### 1.3.3 SITE CONDITIONS

START observed an operating manufacturing facility and an operating salvaged parts sale facility approximately 1.5 miles northeast of the site on Gould Road. The interiors of the two furnace/processing building have undergone extensive dismantling and a majority of the processing and furnace equipment has been removed for salvage. Plant J-1 contains 7 transformers, which are located on three of the floors. Plant J-2 contains 3 transformers located on the third and fourth floors. A fourth transformer is believed to be located in an inaccessible upper-level room in the south end of Plant J-2. One transformer is also located in the Pumphouse. Three transformers are located in a fenced-in outdoor substation. The fence gate into the substation was observed to be unsecured.

#### 1.4 REFERENCES

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This HASP conforms to the following guidelines established by the regulatory agencies in the following documents:

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- U.S. Department of Labor, OSHA, 29 CFR, Part 1910.1200.
- U.S. Department of Labor, OSHA, 29 CFR, Part 1910 and Part 1926.
- National Institute for Occupational Safety and Health (NIOSH)/OSHA/U.S. Coast Guard (USCG)/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, Publication No. 85-115, 1985.
- Ecology and Environment, Inc., Site Assessment Report for Jefferson Processing Site, Jefferson County, Mingo Junction, Ohio, dated January 31, 2000.
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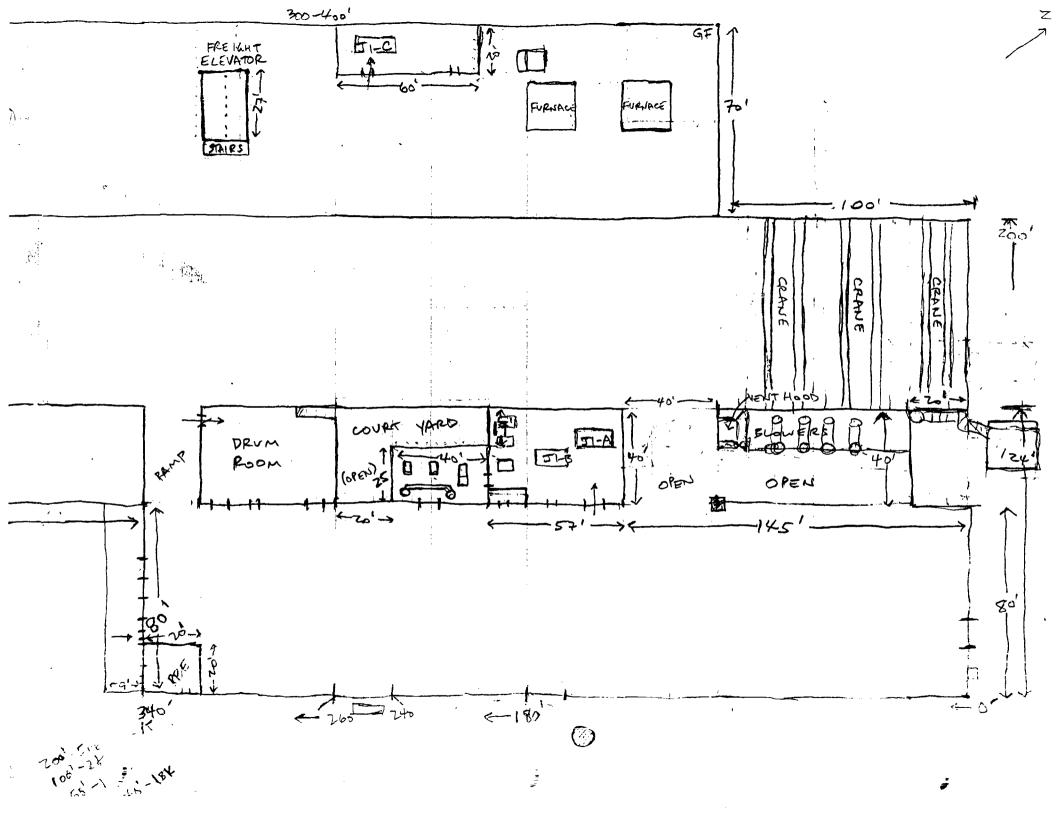
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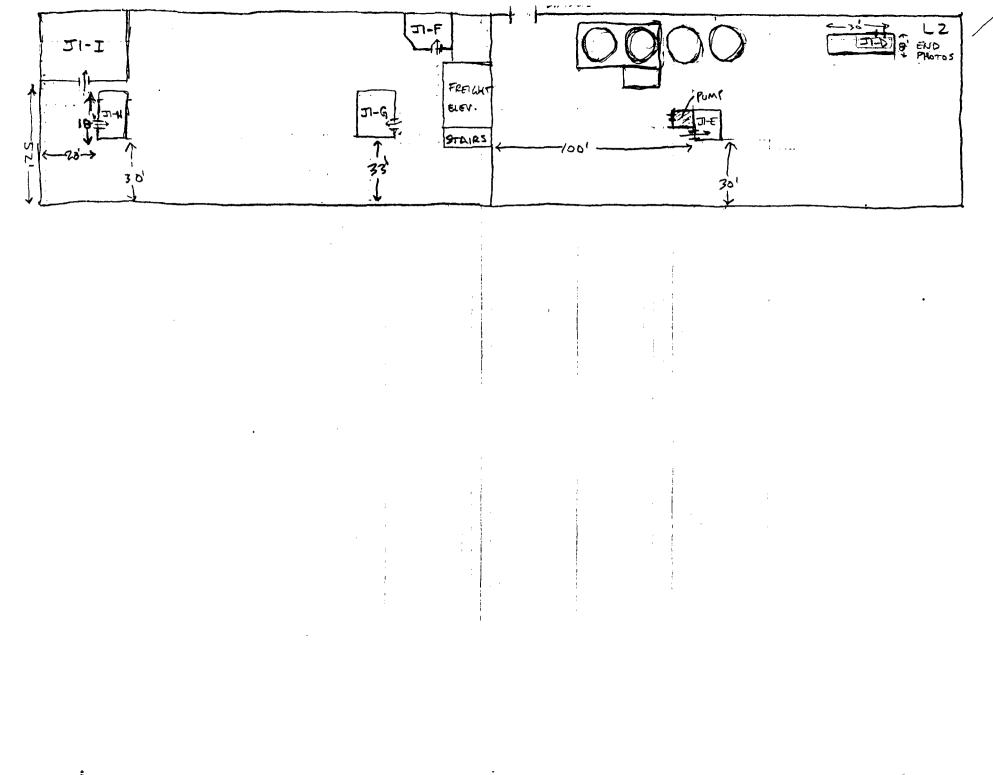
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Fig. 1 Jefferson Processing Site Map

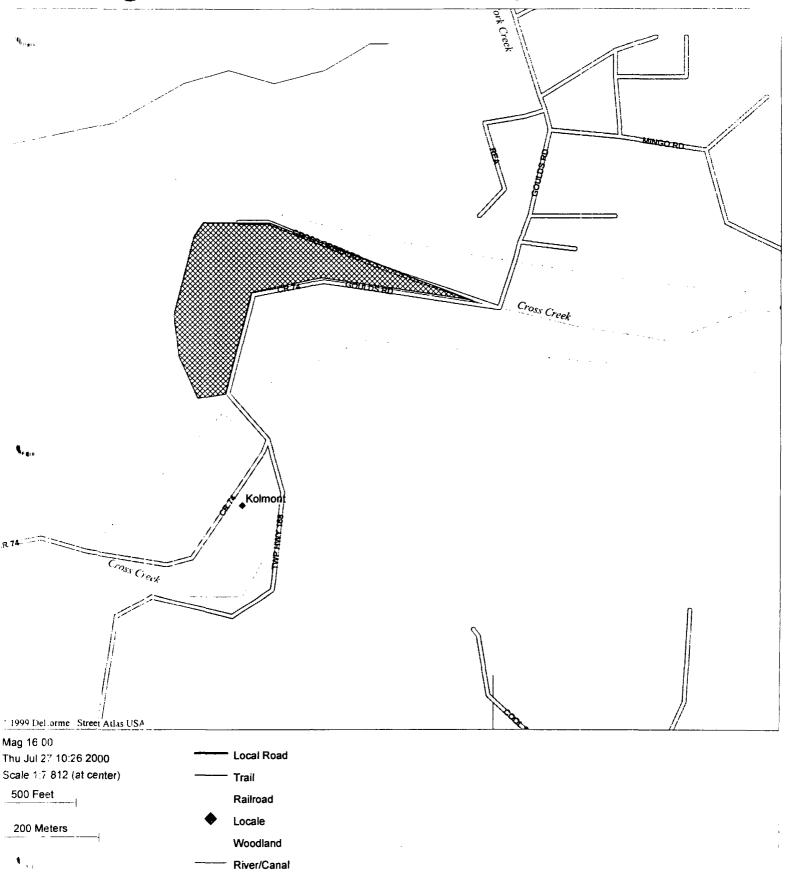
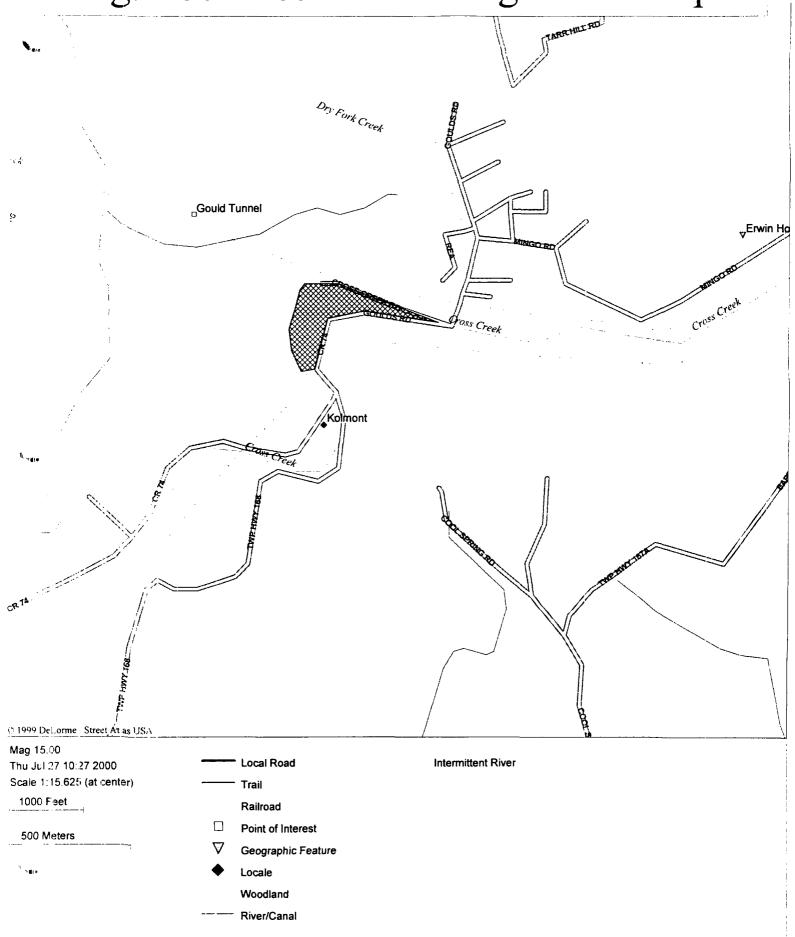


Fig. 2 Jefferson Processing Detail Map



## 2.1 GENERAL

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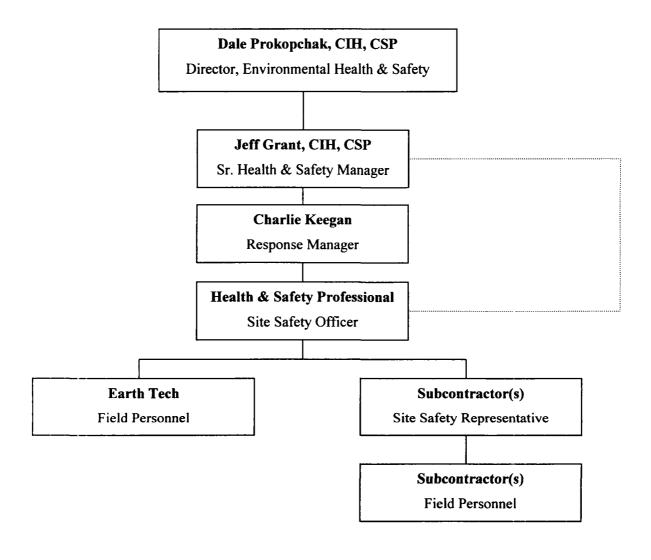
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- Perform hot-work cutting to access locked areas;
- Inactive electrical component assessments (transformers, capacitors, etc.);
- Sample, drain, flush and containerize polychlorinated biphenyl-containing liquids/oils from inactive electrical components;
- Perform personal and area air monitoring;
- Ship bulk samples and air monitoring media to contract laboratories for analysis and interpret results upon receipt;
- Capacitor packaging and disposal;
- Remove (including hoisting/rigging) transformer carcass; prepare for disposal and load trucks when necessary;
- Limited building demolition for accessibility (primarily cinder block walls constructed around the transformers);
- Remove/handle non-friable asbestos containing materials as needed to effect the removal of the transformers:
- Clear vegetation and widen site access road to accommodate wide loads for removal of transformers from the site.

3.0 Project Health and Safety Organization

## 3.1 ORGANIZATIONAL STRUCTURES

Figure 3 shows the organizational structure of the Earth Tech health and safety management for the Jefferson Processing project.

FIGURE 3: PROJECT HEALTH AND SAFETY ORGANIZATION



#### 3.2 ALL PERSONNEL

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All personnel are responsible for their own health and safety, for completing tasks in a safe manner, and for reporting any unsafe acts or conditions to the OSC, their supervisor and/or the Site Safety Officer (SSO). All personnel are responsible for continuous adherence to these health and safety procedures during the performance of their work. No person may work in a manner that conflicts with the letter or intent of safety and environmental precautions expressed in these procedures. Earth Tech employees are subject to progressive discipline and may be terminated for blatant or continued violations. Subcontractor employees who violate health and safety regulations will be warned via the subcontractor's supervisor; then, after due warning, will be denied access to the site.

## 3.3 PROJECT MANAGEMENT

An individual RM will lead each project and is ultimately responsible for ensuring that all project activities are completed in accordance with requirements set forth in this plan. The Jefferson Processing site RM, Charlie Keegan, will confer with the OSC, SSO and/or the HSM on all matters affecting health and safety. The RM will communicate with the OSC as frequently as dictated by the OSC, but at least daily, regarding site clean-up progress and any problems encountered. At a minimum, this will be accomplished during the Daily Work Order meeting at the end of each workday.

#### 3.3.1 PROJECT MANAGEMENT RESPONSIBILITIES

The RM health and safety responsibilities relating to the Jefferson Processing site include, but are not limited to

- Ensuring that the project is performed in a manner consistent with this HASP.
- Ensuring that this plan, where required, is approved and properly implemented.
- Providing the HSM with sufficient information, reasonably in advance of projects, to allow a proper evaluation of the operational or procedural hazards.
- Ensuring sufficient funds are allocated in projects to fully implement the safety procedures required.
- Ensuring that the medical surveillance requirements within the HASP are enforced.
- Investigating and reporting accidents/incidents, and determining if modifications in work practices are required due to an accidental exposure or injury.
- Ensuring personnel are properly trained and informed about assigned tasks.

#### 3.3.2 PROJECT MANAGEMENT AUTHORITY

The authority of the RM associated with health and safety programs of the project includes, but is not limited to:

- Assigning an approved SSO to projects when required.
- Temporarily suspending field activities if the health and safety of personnel or bystanders is er dangered, pending evaluation by the HSM.

#### 3.4 HEALTH AND SAFETY MANAGER

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The HSM, Jeff Grant, CIH, CSP, is responsible for establishing, implementing, monitoring, and administering the corporate Health and Safety Program; ensuring that the program is in compliance with all federal state, and/or local requirements; monitoring the effectiveness of the company's program, and making recommendations to improve it; and overseeing and coordinating all communications with federal, state, and local safety and health agencies. This includes keeping the project HASP current with new regulations and techniques, and in accordance with contract-specific health and safety requirements.

#### 3.4.1 HEALTH AND SAFETY MANAGER RESPONSIBILITIES

The HSM health and safety responsibilities relating to the project include, but are not limited to:

- Providing technical advice to the RM.
- Monitoring and interpreting changes in relevant regulations, technology, and work practices.
- Developing and/or providing input on all health and safety-related policies and procedures.
- Routinely evaluating the HASP, and reporting the status and recommended changes for activities associated with the program.
- Providing the RM with guidance relative to the requirements, effectiveness, and needs of the HASP.
- Ensuring that the medical surveillance requirements within the HASP are identified.
- Er suring that the training requirements within the HASP are identified.
- Evaluating health and safety equipment needs for this project and reporting these needs to the RM.
- Reviewing accident investigation reports to ensure that corrective actions identified are appropriate.

#### 3.4.2 HEALTH AND SAFETY MANAGER AUTHORITY

The authority of the HSM includes, but is not limited to:

- Approving employee qualifications to work in selected activities based on health and safety considerations.
- Approving or disapproving HASPs and supplemental documents.
- Establishing employee training and medical surveillance procedures.
- Suspending work on any project or activity that jeopardizes personnel health and safety.
- Authorizing or restricting personnel for work on hazardous waste sites based on medical and/or training status.
- Directing changes in work practices to improve health and safety.
- Acting as the official representative for safety matters within the division.
- Determining whether a change in an individual's work assignments is required due to injury, accidental exposure, or pregnancy.
- Determining the need for HASPs for specific projects or operations, or the appropriateness of specific SOPs.
- As required, meeting with clients to discuss the details of safety and health planning documents.
- Auditing facilities and field activities to evaluate performance/compliance with the Health and Safety Program on a periodic and as-needed basis.

- Directing changes in work practices to improve health and safety, and removing individuals from operations when their conduct jeopardizes the health and safety of themselves or others.
- Suspending work on any project or activity that jeopardizes the safety of anyone in the area.
- Suspending work on a project or activity if the HASP and/or protocols used appear to be inappropriate or inadequate.

#### 3.5 SITE HEALTH AND SAFETY OFFICER

The SSO will be the senior Health and Safety Professional onsite.

#### 3.5.1 RESPONSIBILITIES

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The SSO is responsible to:

- Maintain data on regulatory information [e.g., OSHA, Superfund Amendments and Reauthorization Act (SARA) Title III, Right-to-Know] and be sure that timely reports are filed to appropriate agencies.
- Provide information to keep project current with new regulations, new techniques, and new topics for safety meetings.
- Provide leadership and support for the health and safety program.
- Assign sufficient personnel and allocate enough resources to implement the program at all levels.
- Monitor the lost time incidence rate for this project and work toward improving it.
- Monitor regulatory compliance and work toward zero citations and violations.
- Encourage site personnel to make safety their number one priority.
- Inspect the site at least monthly (per HSM) for regulatory violations and possible hazards in accordance with SOPs.
- Train and educate workers in methods and techniques that are most hazard-free.
- Ensure that employees understand the properties and hazards of materials to be used.
- Ensure that employees have had training in the following areas as necessary:
  - 1. Hazard Communication (chemical safety);
  - 2. Confined spaces, locations, and confined space entry procedures;
  - 3. Emergency operations procedures;
  - 4. Use and care of personal protective equipment (PPE);
  - 5. Electrical safety including lockout and tagout procedures;
  - 6. Respiratory protection and equipment; and
  - 7. Other appropriate topics based on the hazards at this job site.
- Conduct daily safety meetings with on-site Earth Tech personnel.
- Ensure that employees understand that they are responsible for their own safety and that they develop the right attitude toward safety practices.
- Ensure that employees have and use the proper tools, training, and equipment.
- D scipline employees who ignore safety rules and practices after attempts at training have failed.
- Monitor areas of responsibility to ensure that changing conditions do not result in human, situational, or environmental factors capable of causing accidents. Develop and implement corrective action plans to eliminate or mitigate hazards.
- Ensure that housekeeping in all areas under their control is up to the desired level.
- Ensure all injuries/illnesses/accidents and near misses are investigated in accordance with the HASP.

- Implement any monitoring programs established according to directives outlined in the HASP ard its supplements.
- Forward any employee exposure monitoring information to the HSM to allow for exposure evaluation and employee notification.

At the discretion of the RM, he may designate an on-site person as an assistant Site Health and Safety Technician.

#### 3.5.2 SITE SAFETY OFFICER AUTHORITY

The SSO has authority to:

- Temporarily suspend field activities if the health and safety of personnel are endangered, pending further consideration by the HSM.
- Temporarily suspend individuals from field activities for infractions against the HASP pending consideration by the HSM and the RM.

#### 3.6 EMPLOYEES

Personnel working on the Jefferson Processing site project are required to read and acknowledge their understanding of this HASP and its supplements. Personnel are expected to abide by the requirements of this HASP and cooperate with site supervisory personnel to ensure a safe and healthful work site.

It is each employee's responsibility to be familiar and in compliance with all health and safety practices and to use required PPE, air monitoring equipment, and other safety devices, as required. In addition, employees shall:

- Notify the RM, in writing, of unsafe conditions and acts.
- Report all injuries, illnesses, accidents, and near-misses immediately.
- Perform all work in a safe and efficient manner.
- Seek training in any area where there are questions as to the safest and most effective way to work or use equipment.

#### 3.6.1 EMPLOYEE RESPONSIBILITIES

It is each employee's responsibility to be familiar and comply with all health and safety practices and to use required PPE, air monitoring equipment, and other safety devices, as required. Responsibilities of employees associated with this project include, but are not limited to:

- Complying with the provisions of and following the procedures defined in the HASP.
- Providing feedback to health and safety management relating to omissions and modifications in the Health and Safety Program.
- Notifying the RM, in writing, of unsafe conditions and acts.
- Reporting all injuries, illnesses, accidents, and near-misses immediately.
- Performing all work in a safe and efficient manner.
- Seeking training in any area where questions exist as to the safest and most effective way to work or use equipment.
- Understanding the policies and procedures specified in the Health and Safety Program, and clarifying those areas where understanding is incomplete.

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#### 3.6.2 EMPLOYEE AUTHORITY

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The health and safety authority of each employee assigned to the Jefferson Processing site project consists of the following:

- Refusing to work in any operation that the employee feels is unsafe, or where specified safety precautions are not adequate or understood.
- Refusing to work on any site or operation where the safety procedures specified in this HASP are not being followed.
- Contacting the HSM at any time to discuss potential concerns.

#### 3.7 SUBCONTRACTORS

Upon entering a subcontractor agreement for work performance at the site, the subcontractor will review this HASP(s) prior to the start of work performance, and develop and submit a HASP that is in compliance with this HASP as a minimum, as well as federal and state requirements. Subcontractors are responsible for the safety and health of their employees, and the submittal of the HASP for review is not for the purpose of procedure approval, but rather to ensure compliance with the contract provisions.

## 3.7.1 SUBCONTRACTOR RESPONSIBILITIES

Responsibilities of any subcontractors associated with the project, with respect to the health and safety aspects of the program, include the following:

- Complying with the appropriate provisions of their HASP and SOPs for work performed by their employees.
- Ensuring that subcontractor employees comply with all federal and state health and safety regulations.
- Ensuring that subcontractor employees comply with any specific safety and health provisions required by the client.

#### 3.7.2 Subcontractor Authority

The health and safety authority of subcontractors assigned to the project consists of the following:

• Refusing to work in any operation that the employee feels is unsafe, or where specified safety precautions are not adequate or understood.

## 3.8 ON-SCENE COORDINATOR

The OSC, Mr. Thomas Cook, as the representative of the U.S. EPA is responsible for overall project administration and for coordinating health and safety standards for all individuals on site at all times. All U.S. EPA, Earth Tech, and contractors' health and safety guidelines and requirements, as well as all applicable OHSA standards shall be applied. The OSC is the overall site safety officer and will be responsible for the health and safety of site visitors. However, each contractor (as an employer under OSHA) is also responsible for the health and safety of its employees. If there is any dispute with regard to health and safety, the following procedures shall be followed:

- 1) Attempt to resolve the issue on site; and
- If the issue cannot be resolved, site personnel shall consult off-site health and safety personnel for assistance and the specific task operation in dispute shall be discontinued until the issue is resolved.

## 3.9 SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM (START)

The Ecology and Environment, Inc. (E&E), Superfund Technical Assessment and Response Team (START) is responsible for providing the OSC with assistance and support in regard to all technical, regulatory and safety aspects of site activity. The START is also available to advise the OSC on matters relating to sampling, treatment, packaging, labeling, compatibility, transport, and disposal of hazardous materials, but is not limited to the above-mentioned.

#### 3.10 CLIENT RESPONSIBILITIES

Designated U.S. EPA employees (or equivalent) or contract personnel, assigned to perform specific duties on the project, take responsibility for their compliance with applicable federal, state, and local statutes, ordinances, and regulations regarding health and safety requirements specified in the HASP.

#### 3.11 VISITORS

Unauthorized visitors will not be permitted within established work site control zones. Authorized visitors (e.g., U.S. EPA, etc.) to any work location on the site will be briefed by the RM on the hazards present at the location. Visitors will be escorted at all times at the work location and will be responsible for compliance with their employer's health and safety policies.

#### 3.12 SITE ACCESS DOCUMENTATION

All personnel entering the Jefferson Processing site shall complete the Site Entry/Exit Log located at the Command Post (typically in the site trailer or guard post).

All personnel required to enter established site control zones shall complete the Restricted Area (or "Hot Zone") Log located at the entry/exit control point.

## 4.1 MEDICAL MONITORING AND SUPPORT PROGRAM

All personnel performing fieldwork activities at the Jefferson Processing site shall conform to the medical monitoring requirements specified below and in the SOPs prior to starting assigned work tasks.

#### 4.1.1 PHYSICAL EXAMINATIONS

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Project personnel required to perform tasks that have the potential to expose them to hazards at or above the permissible exposure levels (PELs) as defined by NIOSH/OSHA, or are required to wear respiratory protection, shall have completed (at a minimum) a physical examination in accordance with 29 CFR 1910.120(1) and the requirements of this section, as well any applicable standards governing the specific occupational exposure.

A physician specializing in occupational medicine will evaluate the results of medical examinations. The medical evaluation will include a judgment regarding the employee's ability to use respiratory protective equipment and to participate in work activities associated with the project. The examining physician will document his/her evaluation/recommendations on an appropriate Medical Clearance Form or similar form of documentation. (Earth Tech Health and Safety forms are included with the SOPs or as individual forms in Appendix A). Restrictions of site activities may be required for personnel with certain medical conditions that could be aggravated by specific chemical exposures or physical demands. Each RM is responsible for notifying the SSO and/or HSM of any employee physical or medical restrictions. The SSO, under the direction of the HSM, will then work with the project management staff to ensure that the restrictions noted for a particular employee are properly implemented. A copy of each person's applicable Medical Clearance Form will be made available for review following a request from the HSM, and shall be maintained in the employee's file.

Personnel who are potentially exposed to occupational hazards during the project will require periodic medical examinations. Site/project personnel who have not received a medical examination within 12 months (365 days) of their previous medical exam will:

- Be required to immediately obtain an appropriate medical exam and provide a copy of the Medical Clearance Form to the RM and the SSO for review prior to starting work on the project.
- Be removed from the project until the appropriate medical exam has been performed and a copy of the associated Medical Clearance Form has been provided to the RM and the SSO.

#### 4.1.2 SUBCONTRACTOR PERSONNEL

Subcontractors, upon award of specific work, must provide appropriate documentation of medical surveillance (in accordance with 29 CFR 1910.120(f)), signed by an occupational physician, for all personnel that will be assigned to the project. This documentation must state the ability to perform the work and ability to wear respiratory protection. This documentation must be provided at least seven days prior to work start-up.

Medical certificates must be made available upon request. Any subcontractor employee whose medical certification expires must be prevented by the subcontractor from performing work until the medical recertification is attained.

Medical certification for newly assigned employees must be provided before they begin work on the project.

## 4.1.3 MEDICAL ASSISTANCE

Telephone numbers and locations for local fire department, hospitals, ambulance service, police, and other emergency services shall be posted and maintained by the SSO. Information regarding non-emergency medical treatment for on-site injury, on-site illness, or on-site exposure to chemical contaminants will be provided to the hospital by the supervisor of the employee in question.

#### 4.1.4 FIRST AID

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A first-aid kit will be available and maintained at each work location for use by personnel certified in first aid and CPR by the American Red Cross or equivalent.

First-aid kits supplied for use during the Jefferson Processing site project will comply with the provisions of ANSI Standard Z308.1, "Minimum Requirements for Industrial Unit-Type First-Aid Kits."

All injuries, near misses, and vehicle accidents with or without injuries will be investigated and documented by the SSO in his working log and on the Earth Tech Supervisor's Incident Report. The Incident Report will be distributed in accordance with Section 4.2.1 of this Plan.

#### 4.2 ACCIDENT INVESTIGATION AND PREVENTION PROGRAM

#### 4.2.1 ACCIDENT/INJURY REPORTING

All accidents and incidents during field activities that involve any employee or subcontractor personnel associated with this project will be promptly reported to the SSO and the appropriate supervisor. The SSO will provide notification to the OSC, RM, and the HSM as required by company policy. The supervisor of the injured employee or work crew where the accident occurred will initiate a written report that details the events surrounding the accident/incident in accordance with OSHA requirements.

For accidents and injuries involving Earth Tech personnel, the "Supervisor's Report Of Incident" form (in Appendix A) will be used to ensure all relevant information is recorded. The RM/Supervisor shall complete the "Manager" section of the form and forward it to the SSO. The SSO will then fax the form to the HSM in Grand Rapids, Michigan (616-940-4396) for review/reporting purposes. Copies shall be maintained in the project files.

Accidents or injuries involving subcontractor personnel will require the completion of accident/injury reports by an appropriate representative of that subcontractor, in accordance with federal and state requirements. Following any subcontractor's completion of an accident/injury report associated with this project, the subcontractor will provide the SSO with a copy of a report that details the events surrounding the accident/injury. Additionally, corrective actions undertaken by the subcontractor to prevent reoccurrence or modifications to the subcontractor's health and safety policies developed to inform their personnel of the hazard, will be described as well. Copies shall be maintained in the project files.

OSHA and most states' occupational health and safety programs require verbal notification within 8 hours, and preferably during the same work shift, in the event of a fatality or severe injury requiring hospitalization of three or more employees (see Section 7.4). The HSM or RM will make such notifications to OSHA for Earth Tech and, therefore, must receive the information in time to make the

notification without penalty. The subcontractor shall comply with applicable notification requirements for the subcontractor employees, and must inform the OSC and SSO after notification is made.

The RM and/or the SSO shall record in the site daily activity log information regarding who is on site and the PPE used by each worker.

#### 4.2.2 CLIENT NOTIFICATIONS

In the event of an accident or injury during the project, the RM will inform the HSM and the OSC of the incident and provide him/her with the appropriate information/documentation in order to initiate any additional client notifications that may be required.

#### 4.2.3 ACCIDENT PREVENTION PROCEDURES

All site employees who work on the Jefferson Processing site shall comply with the site's accident prevention program.

#### 4.3 HEALTH AND SAFETY TRAINING PROGRAMS

This section outlines the health and safety training programs that will be performed and maintained by personnel for the duration of the project. This HASP has not been developed to address all of the potential hazards anticipated during the performance of this program; therefore, supplemental health and safety documents will be developed to detail the specific health and safety training requirements associated with each task.

#### 4.3.1 GENERAL HEALTH AND SAFETY TRAINING

All field personnel and visitors involved with site activities will have completed the necessary health and safety training courses prior to entering restricted/controlled areas of the site (Exclusion or Contamination Reduction zones). To comply with the provisions established in 29 CFR 1910.120 (e)(2) and (e)(3) (40-hour or 24-hour initial training), the basic training topics will include, but are not limited to:

- Hazard communication
- Flammable atmospheres and ignition controls
- Toxic chemical recognition
- Exposure guidelines
- Protective clothing
- Respiratory protection
- Hearing conservation
- Heat/cold stress
- Decontamination
- Prevention of slip, trip, and fall hazards
- Sε fe lifting techniques and safe work practices.

All personnel will receive annual refresher training in accordance with 29 CFR 1910.120 (e)(8). Work supervisors will receive an additional required eight hours of training that addresses supervisor responsibilities and obligations in maintaining an effective health and safety program in accordance with 29 CFR 1910 120 (e)(4). Copies of employee HAZWOPER certification are included as Appendix B.

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Subcontractors will be prepared to provide appropriate information that documents any required training programs associated with the particular site activities being performed (e.g., forklift operations, confined space entry, etc.), and any other training required by federal or state health and safety regulations.

Additional training is required for other specific tasks that may be needed, such as confined space entry, lockout/tagout, etc. Personnel must receive the proper training prior to starting the assigned work task(s).

#### 4.3.2 SIFE-SPECIFIC TRAINING

In addition to the task-specific supplements associated with individual program locations, personnel will be

- Instructed on the contents of applicable portions of this plan and any supplemental health and safety information developed for the program tasks to be performed.
- Made aware of task-specific physical hazards and other hazards that may be encountered during site work. This includes any client-specific required training for health and safety.
- Informed about the potential routes of exposure, protective clothing, precautionary measures, and symptoms or signs of chemical exposure and heat stress.
- Made aware of fire prevention measures, fire extinguishment methods, and evacuation procedures.

The site-specific training will be performed at the start of the program and on a monthly basis thereafter. Training will be conducted by the SSO and will be documented on the Tailgate Safety Briefing Sign-in Log (although considered separate from the Tailgate Safety Briefings). Copies of all training shall be maintained in the project files.

#### 4.3.3 HAZWOPER TRAINING EXCEPTIONS

OSHA regulations mandate specific training requirements for personnel involved in remediation processes and spill response. However, incidental personnel do not require HAZWOPER certification if the site characterization indicates that the potential for health and safety concerns is low, or entry is only allowed into perimeter areas. In addition, surveyors conducting work prior to intrusive activities and asbestos inspectors/abatement specialists providing services in unrestricted areas will not be required to have HAZWOPER certification. Personnel who only visit or deliver to the work site perimeters (e.g., vendors, personnel working in the support zone, etc.) are exempt from the HAZWOPER standard, and do not require certification. Visitors (including regulatory agency personnel) would not require HAZWOPER certification to observe work in progress from perimeter areas.

## 4.3.4 HAZARD COMMUNICATION

The SSO/employees shall ensure compliance with the Hazard Communication Program found in Appendix C of this plan.

#### 4.4 PERSONAL SAMPLING

Should site activities warrant performing personal sampling of employees, the SSO, under the direction of the HSM, will be responsible for specifying the monitoring required, and ensuring employees are notified of the monitoring results in compliance with OSHA regulations and good occupational health practices. Within five working days after the receipt of monitoring results, the HSM will notify each

employee, in writing, of the results that represent that employee's exposure. Copies of air sampling results will be maintained in the project files. In addition, copies shall be provided to the HSM for inclusion in medical records as necessary.

Should the site activities warrant, the subcontractor shall <u>ensure</u> its employees' exposures are quantified via the use of appropriate sampling techniques. The subcontractor shall notify the employees sampled in accordance with health and safety regulations, and provide the results to the SSO for use in determining the potential for other employees' exposure.

#### 4.5 ENVIRONMENTAL SAMPLING

Monitoring shall be performed within the work area on site in order to detect the presence and relative levels of toxic substances, the presence of flammable or explosive atmospheres, and/or oxygen-deficient environments. The data collected throughout monitoring shall be used to determine the appropriate levels of FPE. Monitoring shall be conducted in order to determine baseline data on potential hazards prior to entry in the work area, and periodically while conducting site work to evaluate any changes in conditions of the specific work area.

Monitoring at the Jefferson Processing site will consist of initial monitoring, during changes in site conditions (e.g., excavating in a new location, opening a drum/container or sump, wind direction change, etc.), and at regular intervals throughout the day, during soil excavation, handling, sampling, transportation, and decontamination activities, or as deemed necessary by the SSO. Tables 1 and 6 provide the monitoring equipment and action level requirements for this project.

Any activity conducted in a confined or enclosed area or in site buildings must be monitored for oxygen deficiency and explosion potential, as well as chemical contamination.

**Table 1: Environmental Sampling** 

Instrument:	ni ram, dust, aerosol, fume and mist monitor while disturbing potentially impacted or pacted soils, dusts, debris and/or other materials, including paint chips		
Frequency:	During environmental and construction activities		
Monitoring Location:	Breathing zone, ambient locations		
Instrument:	LEL meter/multi-gas meter (oxygen, LEL, carbon monoxide, etc.)		
Frequency:	While working in potential explosive atmospheres, performing hot work or during confir space entry		
Monitoring Location:	Breathing zone; ambient locations (including confined spaces at three feet vertical intervals throughout the space prior to entry)		

#### 4.6 MONITORING EQUIPMENT CALIBRATION

All instruments used will be calibrated in accordance with the manufacturer's recommendations (owner's manual must be included in the applicable equipment case or immediately obtained by the loaning office or rental agency). If the owner's manual is not available, contact the applicable office representative, rental agency or manufacturer for technical guidance for proper calibration. If equipment can not be precalibrated to specifications, site operations requiring monitoring for worker exposure or off-site migration of contaminants will be postponed or temporarily ceased until this requirement is fulfilled.

## 4.7 STOP WORK AUTHORITY

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All employees have the right and duty to stop work when conditions are unsafe, and to assist in correcting these conditions. Whenever the SSO determines that workplace conditions present an uncontrolled risk of injury or illness to employees, immediate resolution with the appropriate supervisor shall be sought. Should the supervisor be unable or unwilling to correct the unsafe conditions, the SSO is authorized and required to stop work, which shall be immediately binding on all affected Earth Tech employees and subcontractors.

Upon issuing the stop work order, the SSO shall contact the RM and request his/her assistance in implementing corrective action so that operations may be safely resumed. If the RM and the SSO are unable to agree on the necessary corrective actions or the appropriateness of the stop work order, the issue shall be referred to the HSM.

Resumption of <u>safe</u> operations is the primary objective; however, operations shall not resume until the HSM has concurred that workplace conditions now meet acceptable safety standards.

5.0 Hazard Assessment

## 5.1 SITE DESCRIPTION

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The Jefferson Processing site is located in Jefferson County, Ohio. Reference Section 1.3 of this HASP for site information.

## 5.2 GENERAL HAZARDS

During the course of the Jefferson Processing project, personnel may be exposed to a number of occupational and environmental hazards. The primary hazards anticipated for this project include:

- Chemical/Radiological Exposures: Associated with the environmental services (e.g., inventory of chemical hazards, stabilization and containment of hazardous materials, demolition of site structures, excavating, staging, sampling, categorizing, and decontaminating). Site materials that potentially contain or are known to contain various levels of, but not limiting to PCBs, asbestos-containing materials (ACM), arsenic, cadmium, chrome/chromic acid, and iron. The operation of internal combustion engines in site buildings will produce detectable levels of carbon monoxide. Applicable health hazard information in the form of Material Safety Data Sheets (MSDSs) is included in Appendix D.
- *Huzardous Noise:* Produced during heavy equipment operations, construction tasks, material handling and verification activities that may be ongoing around the work site.
- Walking/Working Surfaces: Unsafe and/or elevated walking surfaces.
- Vehicle Operation Hazards: Associated with the operation of heavy equipment, support/sampling equipment and vehicles, as well as potential exposure to active railcars.
- Electrical and Other Powered Machine Hazards: Present during both the operation and maintenance of site support equipment.
- Heat and Cold Stress Environments: Associated with site-specific work activities, PPE usage and geographical project locations.
- Biological Hazards: Associated with exposures to plant/animal vectors and bloodborne pathogens, especially during container inventory and handling. See Appendix A for the Exposure Control Plan for Bloodborne Pathogens.

It is unlikely that this HASP could anticipate all of the hazards associated with the project. Therefore, this HASP has been developed as a programmatic document outlining the protective measures for hazards most likely to be present at each project location. Hazards present at individual work locations not addressed in this HASP will be provided for either in an appropriate supplement or during the semi-annual review of this document. Supplements to this HASP will be/are included in Appendix E.

Supplements associated with this HASP are <u>not</u> to be developed as stand-alone documents. Each of the supplements or addenda generated for the project will be accompanied by this document at all times.

#### 5.2.1 CHEMICAL EXPOSURES

Preventing exposure to toxic chemicals is a primary concern during any activity that may present an exposure potential to site personnel. Most areas associated with the project are not anticipated to be of substantial concern with regard to chemical exposure; however, personnel should be aware of the potential to encounter chemical contaminants while performing environmental services at the site.

Substances can enter the body by inhalation, skin absorption, ingestion, or through a puncture wound (injection). A contaminant can cause damage at the point of contact or it can act systemically, causing a toxic effect at a part of the body distant from the point of initial contact.

Chronic exposure refers to relatively low levels of exposure over a long period of time. Acute exposure refers to high levels of exposure for short periods. The differing toxicity of the chemicals anticipated must be taken into account. Chronic toxins may show no adverse health effects at the time of exposure, but could appear years later. Acute toxins may be capable of extreme health effects during or immediately after excessively high exposures, and may show no residual effects after that. Many chemicals cause both chronic and acute conditions that may vary greatly.

Based on the information from previous soil and water analysis results, the overall chemical hazard potential for performance of work under this plan is significant. Inhalation, ingestion, and skin contact are possible routes of exposure during project activities. The compounds applicable to this site have the potential to create an unhealthful ambient environment for site workers. A brief outline of the site contaminants' properties and exposure symptoms is included below as Table 2. The following information has been compiled from the June 1997 NIOSH *Pocket Guide to Chemical Hazards* and the American Conference of Governmental Industrial Hygienists (ACGIH) *Guide to Occupational Exposure Values 2009*.

## 5.2.1.1 Exposure Information

**Table 2: Exposure Limits** 

	EXPOSURE	DOTENTIAL		
CHEMICAL	PEL	STEL/ CEILING (C)	IDLH	POTENTIAL CARCINOGEN
Asbestos <sup>a</sup>	0.1 f/cc	1 f/cc	ND	Yes
Chromic Acid	0.1 <sup>b</sup>	NA	15°	Yes
Arsenic	0.01	NA	5	Yes
Cadmium <sup>d</sup> and compounds as Cd)	0.005	NA	9	Yes
Iron (Oxides, dust and fumes)	10	NA	2500 <sup>e</sup>	No
Carbon Monoxide	50 ppm	NA	1200 ppm	No
PCB-Chlorodiphenyl (42% Chlorine)	1 skin	NA	5	Yes
PCB-Chlorodiphenyl (54% Chlorine)	0.5 skin	NA	5	Yes

PEL = permissible exposure limit

STEL= short-term exposure limit

IDLH= immediately dangerous to life and health

NA≕ not applicable

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mg/m³= mill grams per cubic meter f/cc = fibers per cubic centimeter

ppm = part: per million

a = 29 (FR 1926.1101, Construction Standard for asbestos.

b = Ceiling

c = as Chromium (VI)

d = 29 (FR 1926.1127, Construction Standard for cadmium

e = as F:

#### 5.2.1.2 Additional HAZCOM Information

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Asbestos: Asbestos is a generic term that applies to a number of naturally occurring, hydrated mineral silicates found in rock which separate into flexible fibers when crushed or processed. The commercially important forms of asbestos are chrysotile, amosite, crocidolite and anthophyllite. Other types include tremolite and actinolite. The most widely used/found in the United States, typically originating from the Canadian asbestos mines, is chrysotile. Since asbestos is insensitive to chemical attack and incombustible, there are over 2,000 uses as processed fibers. It is added to such diverse materials as cement products, construction materials, friction related parts (brake shoes), vinyl, plaster, insulation, asphalt, reinforcing filler in elastomers for packing and gaskets, reinforcing pigment in surface coatings and sealants, thermal and electrical insulation media, industrial tales, cotton, and as filler in industrial greases. Due to the related health hazards, other materials are now replacing asbestos products wherever possible.

Asbestos is a known human carcinogen and breathing asbestos fibers has the potential to cause three specific diseases:

*lung cancer:* Latency period of approximately 15 to 30 years.

mesothelioma: Cancer of the chest lining and abdominal cavities. Latency period of

approximately 20 to 30 years.

asbestosis: Fibrous lung scarring with a latency period of approximately 15 to 30 years.

Tobacco smoking greatly magnifies the risk of asbestosis and lung cancer.

The permissible exposure limit (PEL) and the threshold limit value (TLV) for asbestos is 0.1 fibers per cubic centimeter (f/cc) as outlined by the OSHA in 29 CFR 1926.1101, Asbestos, and by the ACGIH in the guide to Occupational Exposure Values – 2000, respectively.

Heavy Metals: As a group, the heavy metals (e.g., lead, chromium, arsenic, cadmium, etc.) are toxic to a number of organs and organ systems in the body including the liver, kidneys, blood forming organs (primarily located in the bones) and the central nervous system. Acute exposure to metals can produce symptoms such as stomach distress and vomiting, mental confusion and sluggishness, heart palpitations, breathing difficulties and renal (kidney) failure. Chronic exposures can be characterized by deterioration in function of the liver and kidneys, central nervous system degradation, and abnormal changes in blood cell counts (especially white blood cells). Exposure to chromium may also lead to formation of lung and gastric cancers.

The primary route of exposure to heavy metals of concern during this project is contact with contaminated liquids, soils and solids, with potential entry through inhalation and ingestion or open wounds. This necessitates the use of appropriate protective clothing and proper decontamination procedures.

Carbon Monoxide: Carbon monoxide is a colorless, odorless gas. When inhaled, it combines with hemoglobir to prevent the transport of oxygen from the lungs to the tissue. Symptoms of inhaling this chemical asphyxiant include flushed red face, headache, nausea and brain damage from oxygen deprivation. Severe or prolonged exposures can lead to unconsciousness and death. The OSHA PEL is 50 ppm, while the ACGIH TLV is 25 ppm.

## 5.2.1.3 Physical Information

Table 3 provides additional information regarding the contaminants of concern.

**Table 3: Physical Information** 

Chemical	~Vapor Pressure (mm)	Ionization Potential (eV)	LEL/UEL (Percent)	Specific Gravity
Asbestos	~0.0	NA	NA	11.34
Chromic Acid	NA	NA	NA	2.7
Arsenic	~0.0	NA	NA	5.73 (metal)
Cadmium	~0.0	NA	NA	8.65 (metal)
Iron (Oxides, dust and fumes)	~0.0	NA	NA	5.24
Carbon Monoxide	>35 atm	14.01	12.5 / 74	0.97 RgasD
PCB-Chlorediphenyl (42% Chlor ne)	0.001	NA	NA	1.39*
PCB-Chlorodiphenyl (54% Chlorine)	0.00006	NA	NA	1.38*

eV = electron volts

mm = rillimeters

NA = rot applicable ~ = approximate

LEL = lower explosion limit

UEL = upper explosion limit

\* = at 77°F

RgasD = Relative density of gases referenced to air (air = 1)

## 5.2.1.4 Symptom/First Aid Information

Exposure symptoms and applicable first aid information for each material listed above can be referenced from the MSDSs in Appendix D of this HASP.

#### 5.2.2 HEAT STRESS

Heat stress is a major hazard, especially for workers wearing protective clothing. The same protective materials that shield the body from chemical exposure also limit the dissipation of body heat and moisture. Personal protective clothing can therefore create a hazardous condition. Depending on the ambient conditions and the work being performed, heat stress can occur very rapidly, within as little as 15 minutes. Site personnel will be instructed in the identification of a heat stress victim, the first-aid treatment procedures for the victim, and the prevention of heat stress casualties. Reference SOP 17 in Appendix A for additional heat stress information.

## 5.2.2.1 Heat Stress Monitoring

For monitoring the body's recuperative ability from excess heat, the following techniques will be used as a screening mechanism. Visual monitoring of personnel wearing protective clothing will begin when the ambient temperature is 75°F or above. This visual monitoring will look for signs of potential heat stress, including cizziness and tiredness.

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#### OBSERVATION CONCENTRATING ON HEAT STRESS SYMPTOMS

When visual symptoms of heat stress are observed, or when wearing protective equipment when the ambient temperature is above 85°F, the heart rate (HR) should be measured by the radial pulse after 2 minutes in a resting period. The HR at the beginning of the rest period should not exceed 120 beats per minute. If the HR is higher, the next work period should be shortened by 10 minutes (or 33 percent), while the ength of the rest period stays the same. If the pulse rate is 120 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by 33 percent. If data on heart rate approaches maximum heart rates (220 beats per minute minus the person's age in years) at any time, medical attention will be sought.

Body temperature should be measured orally with a digital clinical thermometer in the morning as early as possible in each resting period. Oral temperature (OT) at the beginning of the rest period should not exceed 1°F above the morning's baseline temperature. If it does, the next work period should be shortened by 10 minutes (or 33 percent), while the length of the rest period stays the same. However, if the OT exceeds these guidelines at the beginning of the next period, the following work cycle should be further shortened by 33 percent. OT should be measured again at the end of the rest period to make sure that it has dropped below 100.0°F.

Body water loss (BWL) due to sweating should be measured by weighing the worker in the morning and in the evening. The clothing worn should be similar at both weightings; preferably the worker should be nude. The scale should be accurate to plus or minus ¼ lb. Workers should be instructed to increase their daily intake of fluids and the weight lost should be monitored closely.

Ideally, body fluids should be maintained at a constant level during the workday. This requires replacement of electrolytes lost in sweat as well.

## 5.2.2.2 Prevention of Heat Stress

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One of the major causes of heat casualties is the depletion of body fluids. On the site there will be plenty of fluids available. Personnel should replace water and electrolytes lost from sweating. Commercial mixes such as Gatorade can replace electrolytes. Avoid hot drinks such as coffee and tea, carbonated beverages, or beverages containing alcohol or caffeine.

One or more of the following control measures can be used to help control heat stress and are mandatory if heat stress is detected by elevated resting heart rate above 110 beats per minute.

- 1. Employees should drink plenty of water throughout the day and should increase their salt intake slightly by salting their food a little heavier.
- 2. On-site drinking water will be kept cool, 10-15°C (50-60°F), to encourage personnel to drink of en.
- 3. A work regimen that will provide adequate rest periods for cooling down will be established, as required.
- 4. All personnel will be advised of the dangers and symptoms of heat stroke and exhaustion.
- 5. Cooling devices such as vortex tubes or cooling vests can be worn beneath protective garments.
- 6. Supervisors shall reinforce training daily for workers to monitor themselves and their coworkers for the effects of heat disorders and to take additional breaks, as needed.
- 7. All breaks are taken in a protected rest area.
- B. Employees shall not do other tasks during rest periods.

- 9. Employees shall remove impermeable garments during rest periods.
- 10. All employees shall be informed of the importance of adequate rest, acclimatization, and proper diet in the prevention of heat stress.

Good hygienic standards must be maintained by frequent change of clothing and daily showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

#### 5.2.3 COLD STRESS

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Cold injury (frostbite and hypothermia) may impair a person's ability to work. Low temperatures and wind chill factors should be considered. This section, along with SOP 41 (Appendix A), provides information on cold stress and procedures for preventing and dealing with cold stress. Adverse cold climatic conditions are important considerations in planning and conducting site operations. Ambient temperature effects can include physical discomfort, reduced efficiency, personal injury, and increased accident probability.

#### 5.2.3.1 Cold Stress Effects

Persons working outdoors in temperatures at or below freezing may be frostbitten. Extreme cold for a short time may cause severe injury to the skin, or result in profound generalized cooling, causing death. Body areas with high surface-area-to-volume ratio such as fingers, toes, and ears, are the most susceptible.

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost nip or initial frostbite: characterized by suddenly blanching or whitening of skin.
- Superficial frostbite: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep frostbite: tissues are cold, pale, and solid; extremely serious injury.

## 5.2.3.2 Exposure Limits and Cold Stress Monitoring

Typical exposure limits for work in cold temperatures are presented in Table 4, as a guide for establishing work schedules. Air temperature data and worker exposure times shall be monitored when the ambient temperature is 45°F or below.

#### 5.2.3.3 Control Measures

The dead air space between the warm body and clothing and the outside air is essential. Clothing is worn to keep body warmth in and cold out. Usually, no one type of clothing is best for all weather conditions. Denim is relatively loose-woven, and not only allows water to penetrate, but permits wind to blow away the body heat that should remain trapped between the body and clothing. Duck or goose down is good for stopping wind, but is of little use when wet. Plastic or closely woven nylon is good protection from wind and rain, but offers little insulation against cold.

Many layers of relatively light clothing with an outer shell of windproof material maintain body temperature much better than a single heavy outer garment worn over ordinary indoor clothing. The more air cells each of these clothing layers has, the more efficiently it insulates against body heat loss.

Make sure that clothing allows some venting of perspiration because wet skin will freeze more rapidly than dry skin; use all feasible means to keep as dry as possible. Make full use of windbreaks and avoid exposing skin to the direct effects of wind. The need to wear layers of special clothing may make the wearer very clumsy in performing many routine work procedures. Increased body dimensions must also be considered if tight spaces are encountered.

- Frostnip: Frostnip is not a freezing injury; rewarming should be attempted at the site. Immersion in warm water (100°F to 110°F) is preferred. An alternative method of rewarming is to provide direct contact with the employee's own skin or another person's skin.
- Frostbite: Thawing of the injured area should never be attempted if there is likelihood that refreezing may occur. Keeping the extremity frozen, even for hours, is preferable to thawing followed by refreezing. Therefore, the injured area should be protected and the victim should receive medical attention immediately.

Temperature Range		Maximum
Celsius (degrees)	Fahrenheit (degrees)	Daily Exposure
0 to -18	30 to 0	No limit, providing the person is properly clothed.
-18 to -34	0 to -30	Total work time: 4 hours. Alternate 1 hour in and 1 hour out of the low-temperature area.
-34 to -57	-30 to -70	Two periods of 30 minutes each, at least 4 hours apart. Total low-temperature work time allowed: 1 hour. [Note that some difference exists among individuals. One report recommends 15-minute period, but not over four periods per 8-hour work shift. Another limits periods to 1 hour out of every 4 hours, with a low chill factor (i.e., no wind). A third says that continuous operation for 3 hours at -53°F has been experienced without ill effects].
-57 to -73	-70 to -100	Maximum permissible work time: 5 minutes during an 8-hour working day. At these extreme temperatures, completely enclosed headgear, equipped with a breathing tube running under the clothing and down the leg to preheat the air, is recommended.

Table 4: Maximum Daily Limits for Exposures at Low Temperatures

#### 5.2.4 HAZARDOUS NOISE

Work around large equipment often creates excessive noise. The effects of noise can include physical damage to the ear, pain, and temporary and/or permanent hearing loss. Workers can also be startled, annoyed, or distracted by noise during critical activities.

If workers are expected to work where noise levels exceed an 8-hour time-weighted average (TWA) sound level of 90 dBA (decibels on the A-weighted scale), administrative or engineering controls must be used. In addition, whenever employee noise exposure equals or exceeds an 8-hour TWA sound level of 85 dBA, workers must enroll in a continuing, effective hearing conservation program (reference SOP 42 in Appendix A for more detailed information regarding hearing conservation).

# 5.2.4.1 Noise Exposure Monitoring

Exposure to excessive noise can cause permanent hearing loss. If an excessively high noise level is believed to exist, noise monitoring may be performed. When required, continuous noise measurements will be taken using a calibrated meter on the A-weighted scale set to the "slow" response. Impact noise measurements should be taken using a meter capable of recording peak levels in decibels. Measurements

should be taken at times representative of both maximum and typical levels. This will determine if the noise levels are high enough to require engineering controls or PPE.

If engineering controls cannot be used, or if they fail to reduce sound levels to acceptable levels, employer-provided protective equipment will be available and used. All employers associated with renewal activities will ensure that employees exposed to levels at or above those listed in Table 5 will wear appropriate hearing protection. Hearing protection may be worn at noise levels below this for employee comfort, as long as the equipment does not impair the worker's awareness of the work environment.

The selection of the type of hearing protection will depend on comfort, convenience, and attenuation capabilities. Assigned hearing protection must have sufficient capabilities to reduce the noise levels reaching the ear to below the levels discussed in this section. Contact the SSO for guidance, and refer to Table 5 below.

CONTINUOUS NOISE		IMPACT NOISE		
Sound Level, dBA	Duration Hours	dB Peak	Frequency per Day	
90	8	130	1,000	
95	4	120	10,000	
100	2			
105	1		<del></del>	
110	0.5 (30 min.)			
115	0.25 (15 min.)			
>115	0.125 (7 min.)			

Table 5: Allowable Noise Levels

#### 5.2.5 EXCAVATION AND TRENCHING

The following safe operating guidelines must be adhered to when individuals must dig or enter excavations or trenches greater than 5 feet in depth as referenced in 29 CFR 1926.650, and SOP 22 (Appendix A).

#### 5.2.5.1 Excavation Construction Guidelines

- 1. Excavated materials will be stored and retained at least 3 feet from the edge of the excavation. (Note: this procedure should be observed even when excavation/trench entry will not occur).
- 2. Trees, boulders, and other surface encumbrances that create a hazard will be removed or made safe before excavation is begun.
- 3. All slopes will be excavated to at least the appropriate angle of repose, except for solid rock areas. The determination of the angle of repose and design of the supporting system will be based on these factors: depth of cut; possible variation in water content of the materials while the excavation is open; anticipated changes from exposure to air, sun, water, or freezing; loading imposed by structures, equipment, overlying material, or stored material; and vibration from equipment, blasting, traffic, or other sources. The angle of repose will be flattened when an excavation encounters wet conditions, silty materials, loose boulders, and areas where erosion and deep frost action occur.

- 4. Support systems (i.e., piling, cribbing, shoring, etc.) will be planned and designed by a qualified person when the excavation is in excess of 20 feet in depth, adjacent to structures, or subject to vibration or groundwater.
- 5. Materials used for sheeting, sheet piling, cribbing, bracing, and underpinning will be in good, serviceable condition.
- 6. Special precautions will be taken in sloping or shoring the sides of excavations adjacent to a previously backfilled excavation.
- 7. Except in hard rock, excavations below the level of the base of the footing of any foundation or retaining wall will not be permitted unless the wall is underpinned and all other precautions have been taken to ensure the stability of the adjacent walls.
- 8. All ladders used in excavation operations will be in accordance with the requirements of 29 CFR 1926 Subpart L.
- 9. Excavations may be entered/exited by use of ladders or ramps. The use of buckets, forklifts, or any other machinery not designed for personnel transportation is prohibited at all times and such use will be cause for removal from the site. (Reference SOP 26 in Appendix A for detailed forklift operating procedures.)
- 10. Where ramps, walkways, or bridges are used for employees or equipment, they will be designed and constructed by a qualified person in accordance with accepted engineering requirements. When personnel are requested to be in excavations 5 feet or more deep, an adequate means of exit, such as a ladder or steps, will be provided.
- 11. Excavations will be inspected daily, or more often as conditions warrant, by a competent person to ensure that changes in temperature, precipitation, shallow groundwater, overburden, nearby building weight, vibrations, or nearby equipment operation have not caused weakening of sides, faces, and flows.
- 12. Diversion ditches, dikes, or other suitable means will be used to prevent water from entering an excavation and for drainage of the excavation.
- 13. When mobile equipment is used or allowed adjacent to excavations, stop logs or barricades will be installed. The grade will always be away from the excavation.
- 14. In locations where oxygen deficiency or air contaminants are possible, air samples will be taken in the excavations prior to entry of the excavation. Controls will be established to ensure acceptable atmospheric conditions. Emergency rescue equipment will be readily available where adverse atmospheric conditions may exist or develop during an excavation.
- 15. Dust conditions during excavation will be kept to a minimum. Wetting agents shall be used upon the direction of the SSO. (Note: this housekeeping procedure should be observed even when excavation/trench entry will not occur.)
- 16. Field personnel shall enter an excavation that does not meet entry requirements for no reason except to rescue injured individuals who have fallen into the excavated area.

# 5.2.5.2 Trench Entry Requirements

These requirements will be enforced whenever personnel are required to enter trenches or excavations.

- 1. Expected hazardous ground movement areas and banks more than 5 feet high will be shored, laid back to a stable slope, or equivalent.
- 2. Sides of trenches in unstable or soft material 5 feet or more in depth will be shored, benched, sheeted, braced, sloped, or equivalent.
- 3. Sides of trenches in hard compact soil, including embankments, will be shored or otherwise supported when the trench is 5 feet or more in depth and 8 feet or more in length.

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- 4. Materials used for sheeting, sheet piling, bracing, shoring, and underpinning will be in good, serviceable condition. Care should be taken not to over-stress the lumber being used at an excavation.
- 5. Additional precautions by way of shoring and bracing will be taken to prevent slides or cave-ins when excavations are subjected to vibrations.
- 6. When trenches are shored, the standard shoring system will meet the minimum requirements.

#### 5.2.6 CONFINED SPACE ENTRY

This section provides confined space entry requirements for all employees. These procedures do not apply to other workers on the site. Each employer on the site is responsible for the safe entry procedures for their employees. Client procedures may specify additional requirements.

#### 1. Definitions.

- a. Confined spaces are defined as locations that:
  - 1) Allow for entry of a worker.
  - 2) Are not meant for routine human occupancy.
  - 3) Have restricted means of egress.
- b. There are two types of confined spaces recognized by the Safety and Health regulations:
  - 1) <u>Permit-required confined spaces</u>- Spaces where hazardous atmospheres may exist, and require the full entry procedures of this Section.
  - 2) Non-permit-required confined spaces- Spaces where either hazardous atmospheres will not occur, or, the potential hazard is controlled through means such as ventilation. These spaces do not require full entry procedures, however they do require specific procedures (i.e. turn on ventilation) for entry. An example of a non-permit-required confined space would be a tank (e.g., clarifier or sludge tanks) under construction (note: a tank undergoing repairs may not meet this definition).

# 2. Inventory of All Confined Spaces.

- a. An inventory of confined spaces shall be developed for applicable work sites. This inventory shall include the type of space and the specific location. This inventory shall be maintained at the site, and updated as necessary. Confined spaces that may exist but are not accessible to employees (not on the specific work site) are not required to be inventoried.
- b. Subcontractors shall be provided with the confined space inventory for use in the development of procedures to protect their employees.
- c. If, through the actions of any contractor, a confined space is either created or brought on site, the contractor shall provide this information to all other employers on site to allow for employee protection.
- d. Examples of confined spaces to be noted in the inventory include:
  - 1) manholes
  - 2) tanks/tank trucks
  - 3) excavations/pits

# 3. Determination of Permit versus Non-Permit Confined Spaces.

- a. Employees shall implement confined space entry procedures if entry is required into non-permit-required confined spaces where the work being performed introduces a hazard (e.g., spray painting, welding).
- b. Permit-required confined spaces shall be entered only in accordance with the provisions of this section.
- c. All permit-required confined spaces shall be labeled so that employees are adequately warned of the potential for hazardous atmospheres.
- d. When non-permit-required confined spaces require the implementation of confined space entry procedures because of specific work operations (e.g., painting, welding), all entry points shall be labeled so as to alert all employees of the existence of the hazardous conditions. These signs shall be removed only when the hazard no longer exists (e.g., complete curing of the paint).

## 4. Procedures Prior to Entry.

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- a. Obtain a copy of the Permit-Required Confined Space form. Determine which space will require entry, and what potential hazards may be present (include hazards associated with the work process).
- b. Select the appropriate equipment to measure the potential hazards. As a minimum, select a multi-gas meter capable of measuring oxygen levels, and combustible gas as percent of the lower explosion limit (LEL). Additional instrumentation or detectors shall be selected as needed. For example, a hydrogen sulfide detector shall be used for entry into manholes, detector tubes shall be used where hazardous levels of specific chemicals (e.g., benzene) are suspected. Contact the HSM for assistance as needed.
- c. Determine the acceptable values for the hazardous conditions being measured, based on the equipment in use and the field calibration method. This includes determining the differences expected based on the actual calibration standard (e.g., methane or pentane typical for combustible gas meters), and the anticipated hazard. This information is available from the instrument manufacturer.
- d. Ensure all the equipment selected is within current manufacturer calibration.
- e. Perform field calibration as follows:
  - Combustible gas meters shall be calibrated using appropriate span gas for the detectors to be used. This span gas calibration shall be performed each time the instrument is turned on.
  - 2) Detector tube pumps shall be checked for leakage using the manufacturer's procedures prior to each day's use.
  - 3) Photoionization detectors (PIDs) shall be calibrated using isobutylene, or other material, in accordance with the manufacturer's directions.
  - 4) Other instrumentation shall be calibrated in accordance with manufacturer's directions.
- f. Set up barricades around the space being entered as required. Set up any rescue or retrieval systems.
- g. Institute any required lockout/tagout procedures that are needed (i.e., electrical, steam, liquid flow-pipe blanking)
- h. Ensure that a second person (attendant) is available, and assists in the set-up procedures.

- i. Ensure a means of communication is agreed upon between the entrant and the attendant.
- j. Complete a Confined Space Entry Permit. Have the attendant verify the completion of the required actions, then the Entrant Supervisor shall sign the Permit upon verification of completed actions. The Permit shall be maintained at all authorized entry sites.

## 5. Entry Procedures.

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- a. Carefully remove any access doors or covers. Check the area around the seal to ensure that no flammable situations exist prior to door or cover removal.
- b. Don any required PPE.
- c. Upon removal of the access, check the immediate atmosphere using remote testing procedures to ensure the immediate atmosphere is safe. If any of the parameters being tested are outside accepted ranges (see Permit-Required Confined Space SOP in Appendix A for routine acceptable ranges; contact SSO for ranges not specified), do not enter. Use exhaust ventilation to either remove the contaminant(s) or to correct the oxygen-deficient atmosphere.
- d. If the initial test(s) are within allowable ranges, then slowly enter the space, continually testing the atmosphere in front and to the sides. The entire area where work is to be performed shall be tested prior to performance of any work.
- e. Perform the work. Place the direct read instruments in a location that will not interfere with the work, allow for continual monitoring, and allow for noting any alarms which may activate.
- f. Upon work completion, pick up all equipment and leave the space.

## 6. Post Entry Procedures.

- a. Replace all access covers.
- b. Ensure all signs are visible and legible.
- c. Remove all lockout/tagout equipment.
- d. Note on the permit any problems encountered while in the space.
- e. Finish the permit, and turn in to the Entrant Supervisor.
- f. The Entrant Supervisor shall inspect the permit for completion, and investigate any noted problems. Actions taken to correct noted problems shall be discussed with all authorized entrants and attendants for future implementation.
- g. The completed permit shall be maintained on file as required in this section.

## 7. Training.

- a. Authorized entrants shall be trained in the following areas:
  - 1) the requirements of the applicable regulation, and the provisions of this section.
  - 2) the selection, calibration and use of air measurement equipment.
  - 3) the use and completion of the Confined Space Entry Permit.
  - 4) the potential hazards associated with confined space entry, and the methods of detecting the hazards.
  - 5) means of protection for anticipated hazards.

- b. Authorized attendants shall be trained in the following areas:
  - 1) the areas outlined under authorized entrants.
  - 2) emergency notification requirements.
  - 3) authorized emergency response procedures.
- c. Entry Supervisors shall be trained in the following areas:
  - 1) the areas outlined under authorized attendants.
  - 2) accident and problem investigation techniques.
  - 3) recordkeeping requirements.
- d. All other employees shall be trained:
  - 1) to recognize confined spaces.
  - 2) not to enter confined spaces.

# 8. Recordkeeping.

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- a. Inventories of confined spaces shall be maintained until one year past project completion.
- b. Confined Space Entry Permits shall be maintained for a minimum of one year.
- c. Any airborne measurements, which represent employee exposure, shall be maintained in accordance with the provisions of this manual regarding medical records.
- 9. Multi-Employer Work Sites.
  - a. Earth Tech employees shall perform confined space entry procedures for Earth Tech employees only. All other site personnel shall perform confined space entry procedures in accordance with federal and state regulations and their own requirements.
  - b. Earth Tech personnel shall not enter confined spaces using other employers' completed Permits.

## 5.2.7 ELECTRICAL SAFETY

This section and SOP 28 (Appendix A) outline electrical safety practices to prevent electrical injuries to employees and to protect client and other property. This is primarily concerned with electrical power service equipment, electrical distribution systems and testing, and trouble-shooting electronic equipment.

#### 5.2.7.1 Instructions

Instructions to be observed when performing equipment maintenance activities include, but are not limited to:

- 1. Observe all equipment operating procedures as recommended by the manufacturers.
- 2. Appropriately ground all electrical equipment.
- 3. Provide standard warning signs to identify the electrical hazards, their exact location, and actions necessary to avoid the hazard.
- 4. Observe good housekeeping practices at all times. Give attention to keeping work areas clear around switches, terminals, controls, etc.
- 5. Identify circuit breakers and cut-off switches to indicate equipment controlled.

- 6. Do not perform work on electrical or electronic equipment unless adequately illuminated.
- 7. Use protective equipment such as rubber mats, rubber gloves, and insulated tubing wherever operations warrant.
- 8. Wear approved eye and face protection while working around high voltages.

# 5.2.7.2 Treatment in Case of Injury

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The nearest medical treatment facility is notified in all cases involving injury from electrical shock.

#### 5.2.8 EQUIPMENT LOCKOUT/TAGOUT

This section establishes the minimum requirements for lockout of energy sources that could cause injury to personnel due to unexpected energizing, start-up, or release of stored energy during the operation, repair, or maintenance of equipment or a process. See Appendix A for Earth Tech's SOP.

Only authorized employees shall perform the lockout procedure. All authorized employees shall receive training in recognition of the applicable hazardous energy sources and in adequate methods and means for their isolation.

For activities that require more comprehensive control procedures, a lockout/tagout program will be developed in accordance with 29 CFR 1910.147. SOP 21 provides additional lockout/tagout program guidance.

## 5.2.8.1 Instructions

Instructions to be observed when performing lockout/tagout activities include, but are not limited to:

- 1. Notify all affected employees that a lockout is required and the reason therefore.
- 2. Shut down operating equipment by normal stopping procedures (depress stop button, open toggle switch, etc.).
- 3. Make sure power sources (electrical, mechanical, hydraulic, etc.) are disconnected or isolated from the equipment. Stored energy, such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc., must also be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.
- 4. Lockout the energy-isolating devices with an assigned individual lock. If the device(s) cannot accommodate a lock, contact the site health and safety officer to approve any alternate methods of protection or warning (e.g., tagout, barricade, etc.).
- 5. After ensuring that no personnel are exposed and to ensure that the energy sources have been disconnected, operate the push button or other normal operating controls to make certain the equipment will not operate.

**CAUTION:** Return operating control to neutral position after the test.

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# 5.2.8.2 Restoring Equipment to Service

When the operation is complete and equipment is ready for testing or normal service, check the equipment area to see that no one is exposed. When the equipment is all clear, remove all locks. The energy-isolating devices may be operated to restore energy to equipment.

SPECIAL CAUTION: When restoring pressurized air to an equipment/process, keep all personnel clear of machine pinch points.

# 5.2.8.3 Procedure Involving More Than One Person

In the preceding steps, if more than one individual is required to lock out equipment, each shall place his/her own personal lock on the energy isolating device(s). Project management may lock out equipment for the whole crew. In such cases, it shall be the responsibility of that individual to carry out all steps of the lockout practice and inform the crew when it is safe to work on the equipment. Additionally, the RM shall not remove a crew lock until it has been verified that all individuals are clear.

Employees authorized to perform lockout shall be certain as to which switch, valve, or other energy-isolating devices apply to the equipment being locked out. More than one energy source (electrical, mechanical, etc.) may be involved. Project management shall clear any questionable identification of sources.

#### 5.2.9 POWDER-ACTUATED TOOLS

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The use of hand and portable power tools during the Jefferson Processing project is a potential source of accidents. A fundamental practice of using the right tool in a correct manner, together with proper maintenance and storage, is necessary to prevent personal injury and property damage.

The use of powder-actuated tools must be cleared in advance with project management and used in accordance with Earth Tech rules and OSHA regulations.

- 1. Only powder-actuated tools meeting the design requirements of ANSI A10.3-1977, Safety Requirements for Powder-Actuated Fastening Systems, may be used.
- 2. The operator of a powder-actuated tool must have in his/her possession a valid operator's card showing the tools that he/she is permitted to use and signed by a qualified instructor who has been certified by the Powder Actuated Tool Manufacturers Institute (PATMI).
- 3. The powder-actuated tool must be kept in a locked container. Only qualified operators may have keys to the storage container for powder-actuated tools. The storage container must be labeled "POWDER-ACTUATED TOOL," and the following warning must be attached to the inside cover of the container:

"WARNING - POWDER-ACTUATED TOOL TO BE USED ONLY BY A QUALIFIED OPERATOR AND TO BE KEPT UNDER LOCK AND KEY WHEN NOT IN USE."

- 4. Each tool must be supplied with the following:
  - Operator's instruction and service manual
  - Powder load and fastener chart

- Tool inspection and service record

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- Service tools and accessories. Only approved pole tool assemblies will be used.
- 5. The tool shall be serviced and inspected for worn or damaged parts at regular intervals as recommended by the tool manufacturer. All worn or damaged parts shall be replaced with manufacturer's approved parts by a qualified person before the tool is put back into service. A record of this inspection and service shall be noted and dated on the tool inspection record.
- 6. The instruction manuals, maintenance tools, and accessories supplied with the tool shall be stored in the tool container when not in use.
- 7. Powder-actuated tools and powder loads shall be locked in a container and stored in a safe place when not in use and shall be accessible only to authorized personnel.
- 8. Powder-actuated tools shall not be used in an explosive or flammable atmosphere.
- 9. A loaded tool shall never be left unattended.
- Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tile, hardened steel, glass block, natural rock, hollow tile, or most brick.
- Fasteners shall not be driven into easily penetrated or thin materials or materials of questionable resistance unless backed by a material that will prevent the fastener from passing completely through the other side.
- 12 Fasteners shall not be driven closer than 3 inches (76 mm) from the unsupported edge of masonry materials except for specific applications recommended by the tool manufacturer.
- Fasteners shall not be driven into concrete unless the material thickness is at least three times the fastener shank penetration.
- 14 Fasteners shall not be driven into any spalled area.
- Fasteners shall not be driven through existing holes unless a specific guide means, as recommended by the tool manufacturer, is used to assure positive alignment.
- 16. The operator and all assistants shall wear eye or face protection when tool is in use.
- 17 The operator shall inspect the tool to determine that it is in proper working condition in accordance with the testing methods recommended by the tool manufacturer before using the tool.
- 18. Any tool that is found not to be in working condition shall be immediately removed from service, tagged "DEFECTIVE," and not used until it has been repaired in accordance with the manufacturer's instructions.
- The shield, fixture, adapter, or accessory suited for the application as recommended and supplied by the manufacturer, shall be used.

- 21. Only those fasteners and powder loads recommended by the tool manufacturer for a particular tool, or those providing the same level of safety and performance shall be used.
- 22. Tools shall not be loaded until just prior to the intended firing time.
- 23. If the work is interrupted after loading, then the tool shall be unloaded immediately.
- 24. Neither loaded nor empty tools shall be pointed at any person.
- 25. Hands and feet shall be kept clear of the open barrel end.
- 26. The tool always shall be held perpendicular to the work surface when fastening into any material, except for specific applications recommended by the tool manufacturer.
- 27. In the event of a misfire, the operator shall hold the tool firmly against the work surface for a period of not less than 30 seconds and then follow the instructions set forth in the manufacturer's instructions.
- 28. Powder loads of different powder levels and types shall be kept in separate compartments or containers.
- 29. A sign at least 8 inches by 10 inches (20 cm by 25 cm), using boldface type no less than 1 inch (25 mm) in height, shall be conspicuously posted within 50 feet (15 m) of the area where the tools are being used. The sign shall bear wording similar to the following:

# CAUTION POWDER-ACTUATED TOOL IN USE

30. Cased powder loads shall be coded to identify powder load levels by case color and powder load color. Caseless powder loads shall be coded to identify powder load levels by color and configuration. No powder load, cased or caseless, shall be used if it will properly chamber in any existing commercially available tool and will cause a fastener to have a test velocity in excess of the maximum test velocity specified for that tool. Powder load packages shall provide a visual number-color indication of the powder level of the load.

#### 5.2.10 VEHICLE SAFETY

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The following requirements will be observed during operation of any vehicle or equipment. Reference SOP 33 in Appendix A for detailed vehicle/equipment safety guidelines.

## 5.2.10.1 Standard Operating Procedures

Vehicles are not to be driven at a speed greater than the maximum limit allowed in the area or posted on the roadway. In no event are vehicles driven at a speed greater than is reasonable and prudent, giving due regard to the type of vehicle, visibility, road conditions, traffic, or other conditions or circumstances.

Operators whose alertness is impaired by illness, fatigue, alcohol, drugs, or who are otherwise physically unfit are not allowed to drive a fleet vehicle. Sleeping in parked vehicles with the engine or heater in operation is prohibited.

## 5.2.10.2 Vehicle Safety

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All vehicles associated with the project will be maintained in a safe condition. Maintenance will be performed in accordance with recommended instructions of the manufacturer. The following rules will be observed when performing work activities associated with the project, including during travel to and from work sites/locations.

- 1. Employees are responsible for any vehicle assigned to them; therefore, they must periodically check the gas, oil, tires, battery, etc.
- 2. No open flames are permitted when inspecting the vehicle. Vehicles are not to be operated if an unsafe or defective condition is found or suspected.
- 3. Identified deficiencies or hazards should immediately be reported to the SSO by employees.
- 4. Standing in moving vehicles is prohibited.
- 5. Personnel will be transported only in passenger-carrying vehicles.
- 6. When more than one person other than the driver is transported in a cargo or maintenance-type vehicle, adequate fixed seating and protection from shifting cargo will be provided and used.
- 7. Gasoline and other hazardous materials will not be carried in the passenger-carrying compartment of any vehicle.
- 8. Safety belts must be worn by all occupants.
- 9. Vehicles with limited rear visibility will not be backed without an additional person serving as a spotter. The spotter will be positioned behind the vehicle at a safe distance and appropriately direct the driver to avoid an accident/incident when backing up.

## 5.2.10.3 Safety Devices

The following safety device requirements shall be used at all times as applicable:

- 1. Seat belts are required in all sedans, carry-alls, vans, and trucks.
- 2. Safety chains or cables are required for all trailers to prevent the towed vehicle from breaking loose in the event the tow-bar fails or becomes disconnected.

## 5.2.10.4 Transport of Cargo

The following requirements shall be observed for all cargo transport:

- 1. The transport of hazardous materials over public roadways shall be in accordance with Department of Transportation (DOT), U.S. EPA, and state requirements and regulations.
- 2. Vehicles are not loaded beyond their rated capacity. The load must not obscure the operator's view or in any way interfere with safe operations.
- 3. Heavy loads are properly distributed on the truck bed or trailer to avoid overloading individual tires or axles even though the load is within the rated capacity of the vehicle.
- 4. Loads shall be properly secured at all times.
- 5. Appropriate warning signs will be affixed to the vehicle in accordance with DOT regulations and local traffic ordinances.

# 5.2.10.5 Motor Vehicle Incident Reporting and Investigation

All motor vehicle incidents shall be reported immediately to the SSO and subsequently to the HSM and the RM and OSC. Incidents will be investigated in accordance with Section 4.2.1 of this Plan.

# 5.2.11 SLIPS, TRIPS, FALLS, AND PROTRUDING OBJECTS

In addition to the hazards present when working in elevated areas, hazards from protruding objects, careless movements, or placement of materials on paths or foot traffic areas present a problem with regard to slips, trips, falls, and puncture wounds. Personnel will use a reasonable amount of effort to prevent such injuries.

#### 5.2.12 ELEVATED WORK AREAS

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To minimize the potential for injuries due to falls or dropping tools or equipment, the following procedures and the information in SOP 27, Portable Ladders and Work Platforms (Appendix A), will be observed when working at elevated heights:

- Access to elevated work locations shall be provided through the use of ladders. Such ladders will be sufficiently sturdy, and secured to ensure safety during use. All provisions of 29 CFR 1926.25 through 1926.27 shall be observed; ladders should be inspected prior to each use, or daily if in continuous use, for broken or missing rungs, damaged feet, etc.
- Fall protection must be provided for all elevated work locations that expose workers to a fall of six (6) feet or more. Fall protection may consist of fall prevention, such as standard guardrails or lifebelt and lanyard/tether, or fall arrest system, such as net or body harness with shockabsorbing lanyard.

## 5.2.13 CRANES, DERRICKS, AND HOISTS

Earth Tech personnel shall not operate cranes, derricks and hoists or excavation equipment. Contractors will perform these operations when required. See SOP 25, Cranes and Lifting Devices, for further information.

Contractors are responsible for compliance with applicable Safety and Health regulations (e.g., 29 CFR 1926.550, 1926.554, etc.) in regards to the selection, operation and maintenance of cranes, derricks and hoists. This includes, but is not limited to:

- 1. Maintaining copies of annual inspection records and results at the job site at all times for regulated equipment.
- 2. Using personnel specifically trained and qualified for operating the equipment
- 3. Ensuring that the equipment used is capable of lifting the necessary weight(s).
- 4. Ensuring that equipment is turned off and locked out (i.e. brakes applied) when the equipment is unattended for any length of time.
- 5. Ensure that equipment is kept away from edges of trenches or excavations as required.
- 6. Ensure all required hazard signs and barricades are in place.

#### 5.2.14 UNDERGROUND CONSTRUCTION AND UTILITIES

#### 1. Definitions

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- a. <u>Caisson</u> generally vertical foundation unit below grade or a chamber placed in the ground or water for the purpose of excavating earth.
- b. <u>Cofferdam</u> temporary structure for the control of water or other material during construction.
- c. Shaft vertical or inclined opening excavated below ground level.
- d. <u>Tunnel</u> generally horizontal excavation more than 14 inches in diameter, width or height and more than 6 feet in length below ground or water.
- e. Occupied tunnel a tunnel entered by one or more people.

# 2. General Safety

- a. A safe means of egress and access shall be provided.
- b. Combustible debris shall be removed daily.
- c. When work is not being performed, the access shall be covered or otherwise blocked or restricted access.
- d. A sign in/sign out procedure must be in place to track all employees in and out of a tunnel.
- e. Prior to entering a tunnel, atmospheric testing shall be performed, and the results recorded. Testing shall be the responsibility of each employer for their employees. Earth Tech personnel shall not perform testing for other employers.
- f. Contractors shall comply with applicable Health and Safety regulations regarding underground construction (e.g., 29 CFR 1926 Subpart S, Underground Construction, Caissons, Cofferdams and Compressed Air, etc.).
- g. Personnel who enter tunnels, shafts or caissons shall wear hard hats at all times. If wet conditions exist, steel toed rubber boots shall be worn.

### 3. Training

Prior to entering tunnels, shafts or caissons, Earth Tech employees shall be trained in:

- a. Air monitoring.
- b. Ventilation.
- c. Illumination.
- d. Communications.
- e. Flood control.
- f. Mechanical equipment.
- g. Personal protective equipment.
- h. Explosives.
- i. Fire protection and prevention.
- j. Emergency plans, including evacuation and sign in/sign out procedures.

Various forms of underground utility lines or pipes may be encountered during site activities. Prior to the start of intrusive operations, geophysical clearance is mandated, as well as obtaining authorization from all concerned public and base utility department offices. Should intrusive operations cause equipment to come into contact with utility lines, the SSO and the HSM will be notified immediately. Work will be suspended until the appropriate actions for the particular situations can be taken.

## 5.2.15 MANUAL LIFTING

Most materials associated with investigation activities are moved by hand. The human body is subject to severe damage in the forms of back injury, muscle strains, and hernia if caution is not observed in the handling process. Whenever possible, use at least two people to lift, or roll/lift with your arms as close to the body as possible. Under no circumstances should any one person lift more than 49 pounds unassisted.

#### 5.2.16 HCT WORK

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## 5.2.16.1 Welding/Cutting Operations

Welding may be required to access into locked and/or enclosed areas. Where welding equipment is used for construction, the following procedures will be observed:

- Review SOP 20, Hot Work, prior to starting hot work activities.
- In accordance with 29 CFR 1910.252 paragraph (2)(iv), prior to the commencement of we ding/cutting activities a "Hot Work" permit shall be completed as specified in accordance with Section 5.2.16.2 of this health and safety plan.
- All potential fire hazards within the vicinity of the work location (to a distance of 35 feet from the work location) shall be removed.
- If combustible/flammable materials cannot be removed a minimum distance of 35 feet from the location of the cut/weld, a person shall be designated for exclusive fire watch duty by the SSO to ensure that cuttings or slag do not ignite the materials in the surround area.
  - Each person assigned to fire watch duty shall have no other duties whenever welding operations are in progress.
  - The person assigned to fire watch duty will be equipped with a suitable fire extinguisher and trained in its proper use. In the event of a minor fire, the person assigned to the fire watch shall alert the welder, and attempt to extinguish the fire. The welder will cease operations and will assist the fire watch. If fire-fighting efforts are ineffective, they will sound an alarm or alert others in order to provide assistance or begin evacuation of the area and notify the base or local fire department.
  - The Contractor will be responsible for the safe handling of all welding/cutting equipment as well as the welding/cutting procedure.
- Subcontractor personnel, upon request, will be able to demonstrate to Earth Tech that they have been trained in the safe operation of their equipment and the process which they are performing.
- Personnel directly involved in the actual cutting procedure will be required to wear the minimum PPE as required by 29 CFR 1926.102.

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# 5.2.16.2 Compressed Gas Safety For Welding/Cutting

Compressed gases are used in many operations. For example, supplied-air respirators and welding equipment both stores gases under high pressure and deliver them through a series of lines and pressure dropping regulators. The improper use, storage, and maintenance of compressed gas can result in injury.

## 5.2.16.3 Compressed Gas Cylinders

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The following requirements will be observed when handling, casing, or storing compressed gas cylinders:

- Review SOP 29 before working with compressed gas cylinders.
- Compressed gas cylinders shall be equipped with connections complying with ANSI B57.1-1965,
   "Compressed Gas Cylinder Valve Outlet and Inlet Connections."
- Compressed gas cylinders will comply with applicable Department of Transportation requirements.
- Compressed gas cylinders shall be legibly marked for the purpose of identifying the gas content with either the chemical or trade name of the gas. Such marking shall be by means of stenciling, stamping, or labeling and shall not be readily removable. The markings shall be located on the shoulder of the cylinder.
- Cylinders of compressed gas shall be stored in areas where they are protected from external heat sources such as flame, intense radiant heat, electric arc, or high-temperature steam lines.
- Compressed gas cylinders shall be stored in a well-protected, well-ventilated, dry location, at least 20 feet from highly combustible materials. Assigned storage spaces shall be located where passing or falling objects will not damage cylinders.
- Compressed gas cylinders shall be transported in a manner to prevent them from creating hazard by tipping, falling or rolling.
- All cylinders shall be equipped with valve protection devices when the cylinders are not in use or connected for use.
- Compressed gas cylinders in portable service shall be conveyed by suitable trucks to which they are securely fastened; and all gas cylinders in service shall be securely held in a rack or secured to rigid structures so they will not fall or be knocked over.
- Valve protection devices shall not be used for lifting cylinders. Cylinder valves shall be closed before moving cylinders.
- Cylinder valves shall be closed when work is finished.
- Cylinders shall never be used as rollers or supports whether full or empty.
- Cylinders will be inspected and maintained properly.

## 5.2.16.4 Pressure Regulators

Use of pressure regulators will be in accordance with the following:

- Regulators or automatic reducing valves shall be used only for the gas and at the pressure for which they are intended. Defective fuel gas pressure regulators shall not be used
- Gauges on oxygen regulators shall be marked "USE NO OIL."
- Before connecting a regulator to a cylinder valve, the valve shall be tested by being opened slightly and closed immediately. The valve shall be opened while standing to one side of the outlet; never in front of it.
- Before a regulator is removed from a cylinder, the cylinder valve shall be closed and the gas released from the regulator.

If cylinders are found to have leaky valves or fittings that cannot be stopped by closing the valve, the cylinder shall be taken outdoors away from ignition sources and slowly emptied.

## 5.2.16.5 Hot Work Permit

Prior to any welding, torch cutting, or brazing, a hot work permit shall be obtained in accordance with the following procedures.

- 1. The welder or work supervisor shall complete a "Hot Work" permit form (see SOP in Appendix A). The permit shall document the work operation(s) to be performed, the location of the work, and all safety procedures to be employed (e.g., fire watch).
- 2. The permit shall be approved by the RM or SSO.
- 3. The permit shall be posted in the work area for the duration of all activities addressed by the permit.
- 4. At the completion of all work activities addressed by the permit, or at the end of the work shift, the permit shall be returned to the SSO or RM for inclusion in the project files.

Each permit shall be valid for a period not to exceed a single working shift. If work will continue into a new shift, or will be resumed on the next working day, a new permit will be required, including approval by the SSO or RM.

#### 5.2.17 SITE CLEARING AND GRUBBING

If clearing and grubbing (vegetation removal) is required, personnel will be instructed in incorporating the proper methods of felling, limbing, and bucking logs. This includes such practices as looking for dead limbs before felling trees, making proper cuts to ensure trees fall in the area intended, positioning to avoid being exposed to falling or rolling trees, making sure that branches are not "spring loaded," and handling chain saws to prevent binding.

Heavy equ pment used for clearing and grubbing must be equipped with cabs to protect operators from falling or flying objects. The appropriate PPE, as specified in Section 6.0, must be worn in all clearing and grubbing operations. Personnel operating chain saws will wear full-length chaps, or equivalent, in addition to the standard safety apparel.

#### 5.2.18 BIOLOGICAL HAZARDS

Exposure to bloodborne pathogens during the application of first-aid/CPR, as well as, contact with animals, insects, plants, and syringes (RM stated that only one was observed and it has been removed) can cause injury and illness to personnel. Care must be taken to ensure that these types of injuries are avoided.

Some examples of biological hazards include:

- The Earth Tech Bloodborne Pathogen Exposure Control Plan can be referenced in Appendix A immediately following the SOPs.
- Wild animals, such as snakes, raccoons, squirrels, and rats. These animals not only can bite and scratch, but can carry transmittable diseases (e.g., rabies). Avoid the animals whenever possible. If bitten, go to the nearest medical facility.
- Insects such as ticks, bees, and wasps. Ticks can transmit Lyme disease or Rocky Mountain Spotted Fever. Bees and wasps can sting by injecting a venom, which causes some individuals to experience anaphylactic shock (extreme allergic reaction). Whenever you will enter areas that provide a habitat for insects (e.g., grass areas, woods), wear light-colored clothing, long pants and shirt, and spray exposed skin areas with a DEET-containing repellent. Keep away from high grass wherever possible. Keep your eyes and ears open for bee and wasp nests. If bitten by insects, see a doctor if there is any question of an allergic reaction.
- Plants such as poison ivy and poison oak can cause severe rashes on exposed skin. Be careful
  where you walk, wear long pants, and minimize touching exposed skin with your hands after
  walking through thickly vegetated areas until after you have thoroughly washed your hands with
  water.

#### 5.2.19 WATER SAFETY

As part of the work process, personnel may be required to work over or on water (i.e., lakes, rivers, industrial tanks, sumps, basins, etc.). Whenever this occurs, the following procedures/equipment are required to protect employees:

- USCG-approved life jacket or vest shall be worn while working within five feet of the downward slope to the water. The jacket or vest shall be capable of turning a person face-up if unconscious.
- Ring buoys with 90 feet of safety rope shall be placed at various locations (not to exceed 200 feet apart) for rescue purposes.
- A powerboat shall be available as needed for rescue purposes where the possibility of drowning exists (contact the HSM if this applies to work operations at the Jefferson Processing site).

During the winter months, personnel must exercise caution when ice covers the water. Do not walk on the ice unless there is no other way of performing the work. Then, only walk on ice that is fully frozen, not cracked, and will support the necessary weight. A standby person will be on shore with a means to contact emergency responders in case of an accident.

#### **5.2.20 LADDERS**

This provides general work practices associated with ladders that may be used by Earth Tech personnel. Ladders shall be used and designed in accordance with SOP 27 and any applicable federal, state and/or local regulations (e.g., 29 CFR 1926 Subpart X, Stairways and Ladders, etc.).

## 1. General Requirements

- a. A ladder shall be provided at all personnel points of access if there is a break in elevation of 19 inches or more and if a ramp, runway, sloped embankment, stairway or personnel hoist is not provided.
- b. A ladder shall be inspected before use, and after it has fallen or been involved in an accident.
- c. A ladder shall be immediately tagged "DANGEROUS-DO NOT USE" and taken out of service if any of the following defects are noted:
  - 1) broken, worn or missing rungs, cleats or steps;
  - 2) broken or split side rails;
  - 3) broken or bent guides or iron spreaders; and/or
  - 4) broken or bent locks.
- d. Wood ladders shall be constructed and maintained as prescribed in the ANSI standard A14.1-1990.
- e. Employees shall face the ladder when ascending and descending. Each employee shall use at least one hand when using a ladder. An employee shall not carry anything up and down ladders, which could cause him/her to lose their balance and fall.
- f. Ladders shall be placed on a substantial or stable base.
- g. A ladder shall not be used in a doorway, passageway, driveway or any other location where it can be displaced, unless it is guarded by barricades, or secured to prevent displacement.

#### 2. Portable Ladders

- a. A portable ladder shall be used such that the pitch of the ladder is not more than ¼ of the vertical distance between the base and the top support.
- b. A portable ladder with a pitch less than 1/5 of the vertical distance between the base and the top support shall have the top secured to prevent tipping.
- c. Portable ladders shall be equipped with safety feet, unless the ladder is tied, blocked or otherwise secured. Safety feet are not a substitute for proper securing of the ladder.
- d. A portable ladder used at a pitch of 80 degrees or more shall meet the requirements of a fixed ladder.
- e. A portable ladder, when used to access an upper landing surface, shall either:
  - 1) Extend three feet beyond the upper landing surface;
  - 2) or if it is not feasible to extend three feet beyond the upper landing surface, then the top of the ladder shall be secured, and a grabrail or equivalent shall be provided for employees use in mounting or dismounting the ladder.
- f. A manufactured portable metal ladder shall not be used for electrical work, or where an employee may contact electrical conductors. A ladder shall have nonconductive siderails for employee work around electrical equipment.
- g. A ladder shall not be used or moved unless a minimum of 20 feet is maintained between power transmission or distribution lines.
- h. A manufactured portable ladder shall not be used for more than the following lengths:

  - 3) Trestle ladder, or base/extension sections of a trestle ladder......20 feet
- i. An employee shall not stand on the top two rungs or within three feet of the top of the ladder.
- j. Two portable ladders shall not be spliced together.

- k. Portable extension ladders shall only be adjusted from the ground or floor.
- 1. A portable extension ladder shall be used so that the distance from the vertical surface to the ladder base is about ¼ of the ladder working length.
- m. Employees shall not use the backside of a stepladder for climbing.
- n. Unless equipped with a handrail, the top step and the cap of a stepladder shall not be used
- o. A stepladder shall not be used as a straight ladder by leaning it against a vertical surface.
- p. Stepladders shall only be used when equipped with metal spreader or locking devices to hold the front and back sections in an open position. The ladder shall be opened fully and the spreaders locked when in use.

## 3. Training

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- a. Each employee that uses a ladder shall receive training. This training shall enable each employee to recognize hazards associated with ladders, and the steps to minimize the hazards.
- b. The training shall address the following areas, as applicable:
  - 1) The nature of fall hazards in the work area.
  - 2) The correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used.
  - 3) The proper construction, use and placement of, and care in handling, ladders.
  - 4) The maximum intended loads of the ladders.
  - 5) The provisions of the applicable OSHA regulations, and this Section.
- c. Retraining shall be provided as needed to ensure that employees maintain the knowledge needed to work safely with ladders.

## 5.2.21 IMPACTED SOIL SAMPLING AND REMOVAL

Personnel will be required to handle, characterize and remove contaminated soil from various site locations. Contaminated soil will be sampled, staged, categorized, treated and/or prepared for off-site disposal in accordance with Section 2.0. Dust minimization, site control and personal hygiene is key in reducing the potential for exposure to airborne contaminants. Decontamination of equipment/personnel will be performed in accordance with Section 9.0 of the health and safety plan.

#### 5.2.22 ASBESTOS ASSESSMENT AND ABATEMENT

Site facilities may require additional assessment and/or limited abatement of asbestos-containing materials (ACM). All asbestos/ACM operations, including preparatory activities, ACM waste handling, monitoring and reporting activities, and personnel requirements will be performed in accordance with applicable OSHA standards (29 CFR 1926.1101, Asbestos), state guidelines and U.S. Environmental Protection Agency (EPA) regulations, and as each respective regulation is amended.

In addition, contractors shall make available within 24 hours and upon written request, any records concerning ACM handling, including but not limited to, exposure and training records as required by 29 CFR 1926.1101.

ACM may become a factor during the demolition or removal of facilities, or during utility work associated with site construction activities. Asbestos was used in many facilities prior to 1980. The uses included pipe insulation, floor tiles, wallboard, spray on insulation, boiler refractory, and roofing

materials. 29 CFR 1926.1101 implemented specific requirements concerning asbestos. U.S. EPA, state, and local regulations have been developed to govern asbestos work. These regulations may significantly vary between states and localities.

At a minimum, asbestos related activities will be performed in accordance with the following guidelines.

## 1. Work Plan/Specification Development

- a. If asbestos-containing materials must be removed at the Jefferson Processing site, only personnel who meet state-specific accreditation requirements (at the level required to conduct the subject task) shall perform asbestos removal and disposal operations.
- b. If suspect asbestos-containing material requires removal, and information is not available to prove the material is non-asbestos, field personnel shall presume that the material contains asbestos, and plan the removal in accordance with this Section.

## 2. Sampling of Suspect Materials

- a. Suspect ACM (primarily interiors of structures) shall only be sampled by personnel who are Accredited Building Inspectors in accordance with state requirements.
- b. Laboratories used for the analysis of suspect materials shall, as a minimum, be accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

#### 3. Asbestos Removal Work

- a. Asbestos removal shall only be performed by personnel who are Accredited Asbestos Workers (or equivalent) in accordance with state requirements.
- b. Personnel shall not enter areas where asbestos removal work is being performed unless the individual is qualified to enter (discuss with the HSM prior to entry).

## 4. Disposal of Asbestos

- a. Upon removal, ACM is required to be placed in a specially labeled bag, maintained in a wet condition, then, placed inside a second labeled bag, prior to placement in an enclosed dumpster for transport to the selected disposal site. If placing in bags is not feasible, some other means of packaging for disposal shall be used. This alternate disposal packaging method shall be approved by the accredited Project Designer and the Landfill accepting the waste.
- b. Disposal requirements for asbestos waste vary from state to state. All waste shall be disposed of in accordance with the requirements of the state where disposal will take place. Also, if the waste is not disposed of in the state where generated, ensure that transporting of the waste is in accordance with all states through which the waste will travel.

## 5. Subcontractor Work

- a. Work specifications for subcontractor work shall be developed by an employee who is an accredited Project Designer in accordance with state requirements.
- b. Subcontractors are responsible for the health and safety of their own employees. Specifications shall state that the subcontractor is responsible for compliance with the applicable federal and state safety and health regulations, including the provisions of 29 CFR 1926.1101, Asbestos. In addition, the work specifications shall ensure all appropriate the federal, state and local notifications are completed and submitted by the contractor. All asbestos work and disposal shall be in accordance with applicable federal, state and local regulations.

#### 5.2.23 WASTE CONTAINER HANDLING AND TESTING

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Consolidation of any waste material found on-site will depend on several factors: the number of containers located at the site, the cost associated with consolidating the waste, and the compatibility of the waste materials with one another. Mixing any waste is an inherent risk due to the unknown chemical make-up of the waste material.

Any consolidating/mixing of waste found on-site shall not be performed unless approved by the OSC, RM and/or site Chemist. Specific procedures shall be followed per instructions written or orally given to the site crew.

Handling, sampling and field-testing of containerized waste material (drums or other containers) shall follow the procedures outlined in the site sampling plan and SOP 40 (see Appendix A).

#### 5.2.24 MANAGEMENT AND DISPOSITION OF WASTE COMPRESSED GASES/CONTAINERS

The following text and the information contained in Appendix A (see Item 1 below) will be implemented and adhered to during all field cylinder remediation activities at the Jefferson Processing site:

- 1. All personnel will perform cylinder remediation tasks in accordance with the guidance information provided in the Compressed Gas Association, Inc. (CGA) Pamphlet CGA P-22-1995, *The Responsible Management and Disposition of Compressed Gases and Their Containers*. This document is located in Appendix A of this HASP.
- 2. Upon arrival to the site and prior to starting intrusive cylinder remediation work, the RM or site chemist will contact the applicable local response units (ambulance, paramedics, EMTs, fire department, etc.) for the local area. This communication between the field crew and the local agencies will provide notification of the scheduled cylinder activities in their area and to ensure that only adequately trained personnel treat or receive potentially contaminated workers in the event of an incident involving hazardous materials. Some of the emergency contact numbers can be obtained from Section 7.0 of this HASP.
- 3. All intrusive cylinder activities will be performed in Level B in accordance with Table 6. The RM will not perform intrusive activities on cylinders that have the characteristics of containing materials warranting a higher level of protection than Level B. Any cylinders potentially requiring Level A protection will be marked and handled during a future project phase under a separate HASP Supplement due to the hazards and oversight involved.

## 5.3 GENERAL ENVIRONMENTAL CONTROLS

## 5.3.1 ILLUMINATION

Work areas will be provided with adequate levels of illumination at all times. A minimum lighting intensity of 10 foot-candles will be maintained where site personnel are required to perform gross-type activities.

Should site personnel suspect that the lighting intensity is inadequate, the SSO will ensure the area in question is evaluated. If lighting levels are evaluated and found to be inadequate, proper supplemental lighting equipment will be obtained in order to improve lighting conditions within the areas affected.

#### 5.3.2 HOUSEKEEPING

During site activities, work areas will be continuously policed to remove excess trash and unnecessary debris. Such material will be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal. At no time will debris or trash be intermingled with waste PPE or contaminated materials. Personnel observed throwing contaminated material or PPE away with municipal wastes will be removed from the site.

## 5.3.3 WATER SUPPLY

A water supply meeting the requirements of 29 CFR 1926.51 (a) will be used and consist of the following:

- **Potable Water:** An adequate supply of potable water will be available for personnel consumption. Potable water can be provided in the form of water bottles, canteens, water coolers, or drinking fountains. Where drinking fountains are not available, individual-use cups will be provided as well as adequate disposal containers. Potable water containers will be properly identified in order to distinguish them from nonpotable water sources.
- Nonpotable Water: Nonpotable water may be used for cleaning of equipment and fire fighting activities only. Nonpotable water will not be used for drinking or personal hygiene purposes.

#### 5.3.4 TOILET FACILITIES

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In accordance with 29 CFR 1926.51 a minimum of one toilet facility will be provided for each group of 20 employees or less. Exceptions to this requirement will apply to mobile crews where work activities and locations permit transportation to nearby toilet facilities.

## 5.3.5 WASHING FACILITIES

At each work location, employees will be provided washing facilities in accordance with 29 CFR 1926.51 (f). Every employee, upon leaving the work areas, should wash their hands with soap and water before proceeding to the break areas and at the end of daily work activities.

#### 5.4 COMMUNICATIONS

Effective communication is essential to safe working conditions and the successful completion of the project. External communication will be maintained by personnel using cellular or landline telephones or portable radios. The use of external communications may be needed during well installation, monitoring activities, excavation/trenching, and all other related activities to ensure communications with emergency response units (e.g., police, ambulance teams, fire department, etc.). Each work team will be equipped with an appropriate method of contacting either local or regional emergency services.

## 5.5 BUDDY SYSTEM

All site personnel shall use the buddy system. Workers shall be teamed with at least one additional worker or "buddy." Team members shall routinely maintain visual contact with each other and be alert for signs of illness or toxic exposure, such as:

- 1. Changes in complexion and skin discoloration.
- 2. Changes in coordination or demeanor.
- 3. Excessive salivation and/or papillary response.
- 4. Changes in speech pattern.
- 5. Headaches, dizziness, blurred vision.
- 6. Nausea or cramps.
- 7. Irritation of eyes, skin, or respiratory tract.

Anyone exhibiting symptoms should be taken immediately to the nearest medical facility or stabilized for transport by qualified medical personnel. If imminent danger exists, call the applicable emergency contact number listed in Section 7.0.

# 5.6 HAZARDOUS, SOLID OR MUNICIPAL WASTES

If hazardous wastes are generated during any phase of the project, the waste shall be accumulated, labeled, and disposed of in accordance with applicable federal, state, and/or local regulations.

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6.0 Personal Protective Equipment

# 6.0 PERSONAL PROTECTIVE EQUIPMENT

The harmful effects that chemical substances may have on the human body often necessitate the use of protective clothing. Proper selection of PPE depends on a number of factors. Protection against different types of chemicals and differing concentrations of those substances can be quite varied. The tasks to be performed and the probability of exposure to the substance must also be considered when specifying protective clothing. Once the specific hazard has been identified, appropriate clothing can be selected. The protection level assigned must match the hazard confronted. Protective clothing ensembles range from safety glasses, hard hats, and safety shoes to fully encapsulating suits with a supplied source of breathing air.

The purpose of personal protective clothing and equipment is to shield or isolate individuals from the chemical and physical hazards that may be encountered during work activities. The level of protection required must correspond to the level of hazard known, or suspected, in the specific work area.

Level A provides the highest level of protection and Level D provides the lowest. See Table 6 for an outline of action levels, and see Tables 7 and 8 for specific PPE including glove materials, protective coveralls, and respirator cartridge type.

- Level D will consist of field clothes, outer gloves (if soil/water contact is likely), steel/composite toe and shank safety boots, safety glasses (for minor splash hazards), hard hat, and safety colored (orange or green) vests if working in the field around heavy equipment or vehicles.
- Modified Level D will consist of Tyvek® coveralls (or equivalent), safety glasses, outer gloves with disposable inner gloves, steel/composite toe and shank work boots, hard hat and hearing protection (when exposed to elevated noise levels). Saran-coated suits/coveralls (e.g., Saranex) with sealed seams, faceshields and overboots will be worn if personnel have the potential to be splashed with PCB-containing liquid. Viton™ gloves will be worn if hands and wrists are routinely exposed to PCB-containing liquids (see Tables 7 and 8 for specific PPE type and materials).
- Level C will consist of the same equipment as listed for modified Level D with the addition of a full-face, air-purifying respirator (APR) equipped with GMC/P100 cartridges or equivalent. See Tables 7 and 8 for specific PPE type and materials.
- Level B, if required for working on this project site, consists of the same equipment as listed for Level C with the substitution of a full-face, self-contained breathing apparatus (SCBA) or airline system with an adequate egress air supply in place of a full-face APR.
- Level A is not anticipated for this project. The RM will contact the HSM if a change in site conditions warrant the possibility of Level A protection.

When wearing modified Level D, Levels C or B, all junctures between the chemical protective coverall (i.e., Tyvek suit), boots, and gloves must be taped. The suit must be placed over the boots and gloves (unless working primarily overhead, gloves can be on the outside of the suit sleeves). When taping, remember to leave a tab for easy removal. Stress spots in the suit must also be taped, such as under the arms, crotch seam, down the zipper, and up or across the back.

PPE has been selected consistent with the hazards associated with the expected field activities, and is available in various sizes to provide a good fit for all personnel. Site workers are responsible for maintenance and clean storage of equipment at the site.

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#### 6.1 HEAD PROTECTION

Employees will wear hard hats if the potential exists for exposure to flying or falling objects, or when working around heavy equipment. Hard hats are mandatory when working in areas where overhead hazards are present and to provide protection during operation of heavy equipment. Ear protection and faceshields may be attached to hard hats. Hard hats purchased after July 5, 1994 shall comply with ANSI Z89.1, 1985. Head protection purchased prior to July 5, 1994 shall comply with ANSI Z89.1, 1969.

#### 6.2 EYE PROTECTION

Eye protection will be worn at all times within work areas. Sunglasses may be permitted during activities performed outside as long as they meet the requirements of safety glasses. Wire-framed sunglasses used for eye protection will not be permitted at any time. Subcontractor employees who do not have suitable eye protection will have an appropriate type of eye protection provided to them by their respective employers.

Eye protection will meet the following minimum requirements:

- Provide adequate protection against the particular hazards for which they are designed.
- Be reasonably comfortable when worn under the designated conditions.
- Fit snugly and not unduly interfere with the wearer's movements.
- Be durable

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- Be easily cleaned and disinfected.
- Comply with ANSI Z87.1, 1989 (if purchased prior to July 5, 1994, comply with ANSI Z87.1, 1968).

Contact lenses do not provide adequate eye protection. Contact lens wearers must use the same additional eye protection as non-lens wearers. Contact lenses are generally not acceptable with respirators.

Persons whose vision requires correction and who must wear eye protection may wear goggles or spectacles of one of the following types:

- Spectacles whose protective lenses provide optical correction  $(R_x)$ .
- Goggles that can be worn over corrective (R<sub>x</sub>) spectacles without disturbing the adjustment of the spectacles.
- Goggles that incorporate corrective (R<sub>x</sub>) lenses mounted behind the protective lenses.

#### 6.3 HEARING PROTECTION

Appropriate hearing protection, including earplugs, canal caps, and ear muffs, will be provided when noise may be a problem, such as around heavy machinery, power support equipment, and impact tools. When employees may be exposed to hazardous noise, a hearing conservation program will be implemented in accordance with 29 CFR 1910.95 (see SOP 42 in Appendix A).

#### 6.4 FOOT PROTECTION

Employees will wear appropriate foot protection while working on site, which will consist of leather or water- and chemical-resistant boots with safety toes. Footwear (including leatherwork boots and chemical-resistant boots) must meet the specifications of ANSI Z41.1-1969 (if purchased after July 5,

1994, ANSI Z41, 1991), which is the standard for industrial footwear with safety toes. Protection against liquid hazardous chemicals requires boots of neoprene, polyvinyl chloride (PVC), butyl rubber, or other material selected for resistance to the specific chemical. For tasks where contact with contaminated materials is expected to be slight or nonexistent, leatherwork boots with safety toes are appropriate.

#### 6.5 HAND PROTECTION

Employees will use appropriate hand protection when exposed to hazards that could cause injury to the hands. Gloves must resist puncturing and tearing as well as provide any necessary chemical resistance.

Protective clothing will be worn over glove cuffs to prevent any liquid from spilling into the gloves. A pair of inner gloves adds an extra layer of protection for the hands during the removal of outer gloves and other chemically protective items and will be worn at all times when outer protective gloves are required. Where necessary, heavy leather gloves may be worn over chemical-protective gloves when doing heavy work. If they become contaminated, they will be discarded because leather is difficult to decontaminate.

#### 6.6 RESPIRATORY PROTECTION

The routine use of respiratory protection is not currently anticipated for certain phases of this project. However, if respiratory protection is selected and used for worker comfort or is worn using the upgrade criteria specified in Table 6 of this HASP, the requirements outlined in SOP 13 (Appendix A) will be met.

#### 6.6.1 Breathing Air Quality

Code of Federal Regulations Title 29 Part 1910.134 states breathing air will meet the requirement of the specification for Grade D breathing air as described in the Compressed Gas Association Specification G7.-1966. Earth Tech requires a certificate of analysis from vendors of breathing air show that the air meets this standard. Personnel operating the booster pump used for filling air cylinders must receive a checkout prior to using this equipment.

#### 6.7 BODY PROTECTION

Protective clothing and body protection is selected on the basis of the tasks to be performed and the hazards, both chemical and physical, to which the worker may be exposed. As a minimum for all work areas, including the support and administrative areas, typical work clothing or uniform will be worn. Shorts or tank and halter-tops are not appropriate.

In more hazardous work areas, substantial pants and long sleeves are appropriate. Chemical-protective body protection may be selected using predicted chemical exposures and the clothing manufacturer's chemical-specific permeation and degradation information to provide optimum protection.

#### 6.8 HEALTH AND SAFETY ACTION LEVELS

An action level is a point at which increased protection is required due to the concentration of contaminants in the work area or other environmental conditions. The concentration level (above background level) and the ability of the PPE to protect against that specific contaminant determine each action level. The action levels are based on concentrations in the breathing zone.

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If ambient levels are measured which exceed the action levels in areas accessible to the public or unprotected personnel, necessary site control measures (barricades, warning signs, and mitigative actions, etc.) must be implemented prior to commencing activities at the specific work site.

Personnel should also be able to upgrade or downgrade their level of protection with the concurrence of OSC and SSO.

#### **REASONS TO UPGRADE:**

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- Known or suspected presence of dermal hazards.
- Occurrence or likely occurrence of gas, vapor, or dust emission.
- Change in work task that will increase the exposure or potential exposure to hazardous materials.

#### **REASONS TO DOWNGRADE:**

- New information indicating that the situation is less hazardous than was originally suspected.
- Change in site conditions that decreases the potential hazard.
- Change in work task that will reduce exposure to hazardous materials.

Table 6: Action Levels During Environmental Services

PARAMETER	LOCATION AND INTERVAL	RESPONSE LEVEL (Meter units/ppm above background)	RESPONSE
Dust, mist aerosols (total by mini-ram)	At least every 30 minutes in the worker's breathing zone during activities involving	< 1 mg/m <sup>3</sup>	Continue level D work and continue monitoring
(((((((((((((((((((((((((((((((((((((((	impacted materials. In addition, work area perimeter and/or site perimeter monitoring may be initiated by the SSO based on elevated air monitoring results.	≥ 1 mg/m³	Upgrade to Level C PPE. Contact the OSC and RM, implement mitigation measures, don respirator with P/100 cartridges or equivalent, and continue monitoring.
		≥ 10 mg/m <sup>3</sup>	Temporarily cease work operations, contact the OSC and the HSM to discuss improving site mitigation measures. Possibly upgrade to level B for exclusion zone workers.
Oxygen Levels (multi-gas detector or Oz meter)	In the breathing zone/work area within the confined space prior to and continuously during entry or in the immediate work area during intrusive	19.5 – 23.5 percent (%) O <sub>2</sub>	Continue work and continue monitoring.
	activities involving impacted materials.		Cease work, exit the confined space and contact the SSO.
Explosive	In the breathing zone/work area prior to	<10% LEL	Continue work activities.
Atmospheres (multi-gas detector or CGI)	and during entry in to container/drum, impacted work area or confined space.	≥ 10% LEL	Cease work, exit the area or confined space, and contact the SSO.
Carbon Monoxide (multi-gas detector)	At least every 30 minutes in the worker's breathing zone during indoor activities involving equipment powered by internal combustion engines.	< 30 ppm	Continue Level D work and continue monitoring.
		≥ 30 ppm (Sustained for more than 5 minutes)	Temporarily cease work, vacate the subject work area, implement mitigation measures and consult the SSO.

Table 7: Operation-Specific PPE Guidelines

OPERATION	MINIMUM PPE
Initial Site Mobilization and Preparation  Site demolization  Perform personal and area air monitoring (attach and detach to personnel in clean areas only)  Ship samples and air monitoring media to contract laboratories for analysis and interpret results upon receipt.	Routine Activities: Level D  No impacted material disturbance or handling:  Typical work uniform (no tank tops or shorts)  Safety glasses with side-shields  Safety toe/shank boots  Hearing protection  Hard hat  Hand protection  Safety colored vest (to be worn by ground personnel working near heavy equipment or rail operations)  Other.  Also see Table 8 for specific PPE requirements.
Delineate and set-up work zones  Sample and analyze soils, solids, liquids and other materials identified by the FOSC.  Perform assessments of inactive electrical components (transformers, capacitors, etc.)  Sample, drain, flush and containerize polychlorinated biphenyl-containing liquids/oils from inactive electrical components	Upgrade: Modified Level D  If site tasks require handling or contact with impacted materials requiring increased body protection:  Same as Level D above with the following additions;  Body protection (per Table 8)  Chemical resistant hand protection (per Table 8)  Chemical resistant foot protection (per Table 8)  Faceshield or goggles.  Upgrade: Level C  If airborne contaminants are present requiring the use of respiratory protection:  Same as Modified Level D above with the following additions;  Full-face respirator equipped with GMC cartridges or equivalent chemical cartridge combined with P100.
Perform hot-work cutting to access locked aress	Routine Activities Level C  Typical work uniform (with flame and heat resistant covering)  Welding mask w/shaded lenses  Safety toe/steel boots  Hand protection (w/frame and heat resistant covering)  Full face respirator with P100 cartridges or equivalent.  See Table 8 for specific PPE requirements.

Table 8: Hazard Analyses for PPE

POTENTIAL HAZARDS	DISCUSSION	PERSONAL PROTECTIVE EQUIPMENT	
OVERHEAD HAZARDS	There may overhead work being performed, flying debris or areas where overhead equipment is a problem (e.g., hoisting/rigging, drilling, material excavation).	Hard hat (not required in enclosed equipment cabs). Keep hard hat in cab and wear when dismounting equipment.	
Particulate/flying objects	Areas where personnel are working have the potential of either having a mist occur, or the work generates particulates.	Safety glasses with side-shields.	
Chemical toxicity	When handling contaminated material when a splash hazard exists.	Chemical splash goggles or faceshield.	
<ul> <li>Physical hazard (i.e., noise, radiation)</li> </ul>	Non-ionizing radiation is produced during cutting/torching operations	Wear welding mask with appropriate shaded lenses.	
INHALATION	Vapors, mists and dusts may be generated during site operations (see Table 6 and 7).	Wear respirators (as annotated in Table 6 and 7) when upgrade to Level C is needed. Minimize visible emissions by using dust suppression methods (water).	
Chemical hazards	Possible contamination whenever contaminated material is being handled, or when sampling or working with contaminated wastewater or soil.	Inner and outer nitrile gloves (or equivalent) with duct tape at interfaces when working with impacted materials. Latex gloves are not recommended.	
Physical hazards	If Earth Tech employees perform manual labor, potential exists for cuts/abrasions, blisters, etc. In addition, working outside in cold weather.	Wear gloves (i.e., leather, cotton) when clearing and grubbing, shoveling material or snow, etc. Wear insulated gloves when working outside in cold weather to prevent cold stress.	
Biological hazards	No medical debris expected. If working in an area where poison ivy, oak or sumac are possible, gloves may be needed.	Wear cotton gloves when working in areas where poison ivy, etc. may be present.	
FOOT  Chemical hazards	When handling contaminated materials, performing decon activities or during leaks/spills clean up.	Wear chemical resistant safety boots.	
Physical hazards	Primarily from falling objects, equipment or other physical contact.  Various jobs have the potential for presenting foot hazards. Also, outdoor work in cold weather presents a problem.	Steel toe/shank boots. During outdoor winter activities, ensure insulated foot coverings are worn to prevent cold stress.	

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Table 8: Hazard Analyses for PPE (Continued)

POTENTIAL HAZARDS	DISCUSSION	PERSONAL PROTECTIVE EQUIPMENT
Whole body • Chemical hazards	Potential contact with impacted materials exists (solids and/or liquids) during removal, handling or hauling operations or change in site conditions. Also, possible splashing during decontamination processes or while cleaning up chemical spills.	Wear coated Tyvek® (e.g, Saranex,) if splash hazard exists. Regular Tyvek®, poly-coated Tyvek® or other protective coverall if task presents no potential for splash.
• Physical hazards	Site heavy equipment or vehicles, Working on tanks or from ladders, clearing/grubbing, confined spaces entry.	Implement fall protection standards to minimize fall hazards. When necessary, non-entry rescue/retrieval equipment shall be available or implemented. Safety colored vest (safety orange or green) when working next to heavy equipment on vehicles. Use flag person/spotter as required. Wear leg chaps while clearing and grubbing with chain saws or similar equipment.
Biological hazards	Possible exposure to biological hazards such as poison oak, ivy, sumac, and insects (ticks, bees) and animals.	Wear long pants, and, in areas with likely tick infestation, ensure the use of DEET containing spray, and light colors around the feet/calves area. Do not approach areas where bees have nests, until the proper actions have been taken to remove the nest.
Ear protection	Use of noise producing heavy, hauling and support equipment. Also, possibility of cold hazards during the winter months.	Wear hearing protection as required. Wear earmuffs, or other insulated ear protection, when working in cold conditions.

7.0 Emergency Response Plan

#### 7.0 EMERGENCY RESPONSE PLAN

#### 7.1 INTRODUCTION

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The purpose of this Emergency Response Plan is to outline the necessary response during times of emergency; to minimize hazards to human health; and protect against fire, explosion, flood, and chemical release to soil and air. Effective emergency planning requires coordination and forethought by operating staff. Constant vigilance and awareness of potential hazards and a continuing effort to eliminate or control them are prime requisites to accident prevention. Emergencies sometimes develop, however. An important part of any safety program is preparation for any emergency so proper action may be taken.

This Emergency Response Plan and SOP 34, Emergency Response (see Appendix A) are meant to serve as guides to identify the major considerations in an emergency.

#### 7.2 WHAT IS AN EMERGENCY?

An emergency is any situation (on or off the Jefferson Processing site) that immediately threatens human life, health, the environment, or damage to facilities. The ultimate determination of an emergency situation is left to the discretion of each individual.

Many emergencies potentially include a combination of two or more types of situations. Emergencies that might arise at this facility probably fall within the following categories:

- Explosions
- Hazardous Materials Emergency (Toxic Chemicals, Laboratory Spills)
- Leaking Pipelines, Tanks, Vessels
- Fires
- Power Interruption
- Medical Emergencies
- Safety Equipment Problems

To ensure that facility operations go on with minimum disruption of service, emergencies must be anticipated so plans using alternate methods of operation, emergency repair, first aid, or other emergency response procedures may be put into action. OSHA (and state-sponsored health and safety agencies) requires this written Emergency Response Plan along with specific information and training for employees to be available at this project site.

#### 7.3 IMPLEMENTATION OF EMERGENCY PLAN

It is necessary for an Emergency Response Plan to be at each individual project location. The desire to protect staff members as well as off-site neighbors drives the development and planning of these specific procedures and practices designed to provide rapid, accurate, practical, and safe responses to emergency situations on this project site.

The decision to implement the Emergency Response Plan depends on whether an impending incident could threaten human health or the environment. If an emergency situation arises, decide on the course of action, and then carry out the plans in a safe, orderly, and controlled manner. Do not panic—remain calm and ceal with the incident in a logical and methodical fashion. If the procedure required to correct an emergency situation is too extensive or unsafe to be handled by the personnel on hand, additional

personnel must be contacted. DO NOT ATTEMPT RESOLUTION OF AN EMERGENCY IF A LOGICAL COURSE OF ACTION IS NOT READILY APPARENT—GET HELP!!

Any person discovering an emergency situation should contact the proper agencies (e.g., Police Department, Fire Department) and the Primary Emergency Coordinator or the Alternate if the Primary Coordinator is unavailable or cannot be reached. The Primary and Alternate Coordinators have complete authority to commit all of Earth Tech resources in the event of an emergency. The Emergency Coordinator will determine which organizations must be contacted based on the nature of the emergency. The list in Section 7.4 below provides the list of the emergency contacts, and the necessary phone and/or pager numbers. Figures 4 and 5 depict the routes to the nearest hospital from the Jefferson Processing site. Figure 6 is a detailed support map.

#### 7.4 EMERGENCY COORDINATOR AND STAFF

Employers recognize the need to be prepared in the event of an emergency so that damage to human health and to the environment can be avoided or minimized. A key figure in implementing a response plan is the Emergency Coordinator. His or her specific responsibilities and duties during and after the emergency incident are described in the following section. However, the emphasis on prevention and immediate response to hazardous conditions requires that the Coordinator be free to use professional judgment in emergency situations. Frequent inspection and active participation in this project on a daily basis by the Primary and Secondary Coordinator minimizes the chance of a major accident.

It is the Emergency Coordinator's responsibility to manage emergency situations with all available assets instead of merely providing a response to a crisis. Emergency management applies good planning, definition of roles and authority, and direction of a trained and motivated staff to control the situation and resolve it quickly and efficiently. Below is a list of the names and numbers for the various emergency coordinaters and contacts.

In most cases, reducing the pressure source by either closing/opening a valve, shutting down a pump, or shutting off an ignition source will deter an explosion.

An explosion may also create hazards subsequent to itself, such as fire or toxic vapor release. Without endangering personnel, make a quick assessment of the situation. Call the emergency service agency (e.g., Fire Department) immediately and, if there are injuries, ask for medical assistance. Next, contact an Emergency Coordinator. When calling in the emergency, give your location, describe the nature of the emergency, and provide your name.

You may wish to send someone to meet the responders outside the area to direct them to the scene and familiarize them with the conditions there (e.g., electrical, vapors, chemicals).

Any time the Emergency Response Plan is implemented, a detailed report of the entire incident will be recorded. Careful documentation during and after an emergency will be needed for insurance issues, legal issues, accident investigations and analysis to prevent re-occurrence. Good record keeping and a critique of an incident after the fact can provide an excellent method of preventing another incident. All records will be maintained in project files.

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#### 7.5 EMERGENCY CONDITION/RESPONSE

The purpose of this section is to provide guidance to the Emergency Coordinator and staff in making emergency decisions. The following sections discuss a number of possible emergency situations, which could occur at this site. Remember that many emergencies may include a combination of two or more types of situations at the same time.

In the event of any emergency incident:

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- Work activities will cease and all project personnel will be evacuated from the work location. The evacuation will proceed in a direction opposite the critically affected area, with all personnel assembling in a pre-designated location outside of the job site proper.
- A neadcount will be taken of the assembled employees and any injured individuals shall be administered first aid.
- If not present at the work location, the SSO, Emergency Coordinator and OSC will be contacted immediately.

A universal signal for emergency evacuation (e.g., use of a horn), and designation of the evacuation assembly location, shall be established by the SSO and Emergency Coordinator and briefed to all workers during initial site-specific training. Any changes mandated by changing site conditions shall be determined by the Emergency Coordinator and communicated to workers during the tailgate safety briefing.

The following list will be expanded if additional emergency situations are confronted.

- Explosions
- Hazardous Materials Emergency (Toxic Chemicals, Laboratory Spills)
- Leaking Pipelines, Tanks, Vessels
- Fires
- Power Interruption
- Medical Emergencies
- Safety Equipment Problems

#### 7.5.1 EXPLOSION

The possibility of an explosion may exist at this project site. Some explosion risks include:

- Flammable containers (contents of many of the containers have flash points at room temperature).
- Explosive gases collected in low areas (manholes, etc.)
- High/Low pressure air lines
- Pressurized water lines
- Electrical receivers

#### 7.5.2 HAZARDOUS MATERIAL RELEASE

The most common hazardous materials at this project are:

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- Laboratory/field chemicals
- Cleaning solutions, acids/bases
- Impacted materials release (PCBs, ACM, water, etc.)

The appropriate emergency response to a hazardous materials incident will be dictated by the MSDS (see Appendix D).

To deter or minimize a release of a hazardous material, a person may close a valve or flick a switch as they are leaving the affected area. Do not attempt to re-enter the affected area without proper equipment, training, and assistance.

Special response equipment and PPE are needed when responding to hazardous materials incidents.

Without endangering personnel, make a quick assessment of the situation. Call the emergency services agency (Fire Department, etc.) immediately and, if there are injuries, ask for medical assistance. Next, contact an Emergency Coordinator. When calling in the emergency, give your location, describe the nature of the emergency, and provide your name.

You may wish to send someone to meet the responders outside the area to direct them to the scene and provide information about the conditions that may exist, including appropriate MSDS of hazardous material. The Fire Department has spill containment dikes, absorbents, neutralizing chemicals and other forms of attack for spills or leaks.

Site personnel who are trained and HAZWOPER-certified (see Appendix B) are available to assist the Fire Department and Emergency Coordinators in addressing the incident.

#### 7.5.2.1 Material Release Response

In the event of a spill or release of hazardous materials brought on site or during the transportation of site materials, the owner and/or carrier of the material is responsible for appropriate notification, remedial and disposal activities. Clean-up operations must return the impacted area or equipment back to pre-release condition.

If a spill or release occurs on site or at a nearby off-site location (requiring limited travel) involving removed or treated site materials, site personnel will provide support to mitigate any further release of the material and clean up the results of the release as requested by the OSC.

#### 7.5.3 LEAKING PIPELINES, TANKS, VESSELS

Ruptures and stoppages in piping systems are always possible. At this project, ruptures are most frequent in pressurized lines (water, air, etc.).

In either case, the first action must be to relieve pressure and isolate the pipe. This may be done by stopping and locking out pumps, and closing valves (to isolate) or opening valves (to relieve pressure.) Bypass the problem to maintain operation if possible.

Emergency procedures after a rupture or stoppage may create other hazards subsequent to the initial incident, such as flooding, and/or may endanger the public. If removal of an underground storage tank is required, reference SOP 23 in Appendix A prior to the commencement of removal activities.

Without endangering personnel, make a quick assessment of the situation. Call the emergency services agency (e.g., Police Department) immediately and, if there are injuries, ask for medical assistance. Next, contact an Emergency Coordinator. When calling in the emergency, give your location, describe the nature of the emergency, and provide your name.

You may wish to send someone to meet the responders outside the area to direct them to the scene and familiarize them with the situation.

When excavation is required for repairs, contact a utility locator service and the RM before digging. If the excavation is near a public throughway, acquire proper signage and traffic control devices.

To clear a stoppage, after relieving pressure, remove the material causing the stoppage. At this project, this mater al could be anything. In some cases, the stoppage can be removed by flushing with high-pressure water. Remember to keep valves open if flushing is attempted. In other cases, the piping must be dismantled and the foreign material removed by hand (see SOP 19, Line Entry). The choice of method is left to the operator.

Follow a few general principles in removing stoppages:

- Personnel must know the piping system and conveyed materials they are working on. They must
  be familiar with the valves and their functions in the system, bypasses, pumps, and, most of all,
  the purpose of the system.
- Never work on any pressure system until the source of the pressure is removed by closing the
  proper valves or turning off the proper pump or compressor. Don't start work until the system
  valves and pumps or compressors are locked and tagged or in the closed-off position, and the
  system pressure has been bled off as necessary.
- When removing material from a line, always wear proper PPE, including gloves to protect hands from anything imbedded in the material, and safety glasses and goggles to protect from splashes.

#### 7.5.4 SEVERE WEATHER

Severe weather includes tornadoes, lightning, and flooding. Some of these conditions, such as tornadoes, can come upon the work site suddenly, with little to no warning. The following actions shall be implemented for each situation:

• Ternadoes - Radio stations will provide updates when conditions are right for tornado formation. The Emergency Coordinator will listen to the continual updates, and if conditions worsen, personnel will either be sent to their homes (if time and conditions allow), or to pre-designated shelters. In the event of being outside when a tornado forms, personnel shall evacuate all equipment and lay flat in the nearest low point in the ground (unless time permits evacuation to the designated shelter).

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- Lightning In the event of lightning, all construction equipment shall be shut off, and personnel shall enter the nearest structure. UNDER no circumstances stand under a solitary tree. If a structure is not nearby, either remain in an enclosed vehicle, or lay flat at a low point on the ground.
- Flooding When flooding is expected, take all equipment to the highest ground level possible. Then workers shall proceed to the highest available point (e.g., multi-story building).

#### 7.5.5 FIRES

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The possibility of a fire may exist in a number of areas around the work sites at this project. Fires are most frequently in electrical devices, in storage areas, and in work areas. A fire may also create hazards subsequent to the fire itself, such as an explosion or toxic vapor release.

Without endangering personnel, make a quick assessment of the situation. Call the emergency service agency (Fire Department). If there are injuries, ask for medical assistance. When calling in the emergency, give your location, describe the nature of the emergency, and provide your name. You may wish to send someone to meet the responders outside the area to direct them to the scene and familiarize them with the existing conditions which may exist.

If the fire is small, try to extinguish it <u>only after help is on the way</u>. It is better to have the fire out when the Fire Department arrives than to discover too late that you cannot control the fire and should have called for help. Pre-planning and training is necessary before performing this task—if you have not been trained in the proper usage of fire extinguishers, do not attempt to control the fire. Leave the area immediately. EXCEPTION: NEVER TRY TO FIGHT A FIRE IN A HAZARDOUS MATERIALS STORAGE AREA.

If you cannot extinguish the fire, follow these general procedures (if it is safe to do so) to prevent further spread of the fire, and minimize damage to personal health and/or the facilities.

- 1. Never endanger your own life.
- 2. Remove any combustible material from the vicinity of the fire.
- 3. Shut down gas supply lines to the area.
- 4. If it is an electrical fire, cut the power to the affected area by pulling the appropriate circuit breaker.
- 5. Hose down nearby structures (only after shutting down all utilities to the structures.)
- 6. Remove any equipment that can be safely moved from the area.
- 7. Close doors, windows, and vents.
- 8. Be aware of chemicals located in the affected area such as welding equipment, propane, and nazardous materials.
- 9. Make appropriate MSDSs available to fire fighters before entry
- 10. Keep all personnel away from affected area.

Fire extinguishers are primarily first response instruments, intended for use on fires in their beginning stages before they get a chance to spread. Portable fire extinguishers have specific regulations developed governing their type and use. Particular attention must be given to selecting the proper type of fire extinguisher for the particular type of fire. The following list shows various types of fire extinguishers, listed in order of preference, typically used with each class of fire.

- Class A for use on materials such as wood, cloth, paper, and rubber
- Class B for use on flammable liquids, gases, and greases
- Class C for use on energized electrical fires (Class A and B extinguishers may be used effectively on de-energized electrical fires)
- Class D for use on combustible metals such as magnesium, titanium, zirconium, sodium, and potassium

NEVER USE A SOLID STREAM OF WATER ON ELECTRICAL FIRES. WATER IS AN EXCELLENT CONDUCTOR OF ELECTRICITY AND ITS USE MAY RESULT IN ELECTRICAL SHOCK.

Remember, if evacuation from a burning facility becomes necessary, Move Quickly to the nearest exit, Keep Calm and Stay Low. The temperature difference between the air at the floor level and eye level can be considerable. Try not to inhale smoke; if necessary, breathe through a damp cloth. If your clothing catches fire "DO NOT RUN" and "STOP, DROP, AND ROLL". Running simply fans the flames and intensifies the fire. If there is a rug, coat, or blanket available, roll in it. Rolling will smother the flames. Once out of the affected area, proceed to an out-of-danger area and when possible, assemble in groups. This prevents interference with fire fighters and at the same time gives the opportunity to account for personnel and to issue further instructions. If you cannot account for everyone and suspect they may still be inside the facility, notify the Fire Department. They give first priority to the preservation of life.

Do Not Reenter the Building for any reason. Clothing, valuables, or other items that were left inside are not worth your life.

#### 7.5.6 POWER INTERRUPTIONS

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Interruptions in power may become emergency situations. Almost all of the equipment used to operate and maintain the project uses electricity.

Power interruptions are emergencies when the potential for damage to human health or the environment exists. Usually during power interruptions, other hazards are present (such as severe weather, etc.).

The person responding to a power interruption should assess the situation, and then contact an emergency coordinator if the potential for an emergency situation exists. Contact the utility company and the client to notify them of the power failure and potential emergency. When calling in the emergency, give location, describe the nature of the emergency, provide your name, and ask when the power is expected to be restored.

If the power interruption is not caused by the power company, an electrician should be called to determine the cause and make corrections.

Remember, work safely in emergency situations!!

#### 7.6 MEDICAL EMERGENCIES

Medical emergencies can be described as situations that present a significant threat to the health of personnel. These can result from chemical exposures, physical injury, heat stress, cold stress, and poisonous insect or snakebites. Medical emergencies must be dealt with immediately and proper care should be administered. This may be in the form of first aid and emergency hospitalization.

In the ever t of a medical emergency:

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- All injured individuals who require it will be given appropriate emergency first aid by a qualified individual trained in first aid.
- Severely injured personnel shall be transported to a hospital.

# 7.7 SAFETY EQUIPMENT PROBLEMS

An emergency may develop due to malfunction or other problems associated with health and safety equipment being used by field personnel. These equipment problems must be corrected before proceeding with field activities. Health and safety problems that may occur include:

- Leaks or tears in protective clothing.
- Failure of respiratory protective devices (e.g., APRs).
- Encountering contaminants for which prescribed PPE may not be suitable.

# 7.8 EMERGENCY/SAFETY EQUIPMENT

#### 7.8.1 LIST OF EQUIPMENT

The following equipment will be available in the field trailer or site vehicles:

- Oxygen and gas detector
- Cartridge-type respirators
- Tyvek suits
- Portable radios
- Cleaner-sanitizer for personal safety equipment
- Explosion-proof, 3-cell flashlights with batteries
- Eve and face protection
- Fire extinguishers
- First aid kits
- Hard hats
- Hearing protection devices
- Seran-coated suits/coveralls with sealed seams
- Hand protection (gloves), inner and outer.

#### 7.8.2 FIRST AID KITS

Each work site shall have a first-aid kit meeting the following requirements:

- First-aid kits in weather-proof containers will be assembled, provided, and maintained in accordance with ANSI and shall be present at all locations where employees will be working.
- First-aid kits shall be available at the job site at all times.
- First-aid kits shall be inspected and restocked weekly. An inventory of first-aid supplies sufficient to restock kits on a weekly basis shall be maintained.
- For jobs outside the local area, the site supervisors shall replenish the kit from the nearest pharmaceutical source, with supplies equivalent to those used.
- Personnel permitted to use first-aid kits shall possess a current first-aid/CPR card.

#### 7.8.3 EYEWASH UNITS

Eyewash units meeting the requirements of ANSI Standard Z358.1-1990 will be used at the site and shall be strategically located for use by personnel in multi-work areas. Eyewashes shall be capable of supplying hands-free irrigation for both eyes for at least 15 minutes at a flow rate of at least 0.4-gallon per minute.

#### 7.8.4 FIRE EXTINGUISHER

As a minimum, fire extinguishers capable of extinguishing Class A, B, and C fires will be available for use at the site at all times. Site personnel will be readily aware of the location of the fire extinguisher at all times in the event of an incident where a fire extinguisher may be used.

# **Table 9: Emergency Contacts**

EMERGENCY COORDIN	VATORS	•	
Names	Title/Workstation	Phone	Pager
Thomas Cook	OSC	(740) 284-1723 (site)	
Charlie Keegan	RM/Primary Coordinator Earth Tech	(NON- RESPONSIVE (740) 284-1515 (site)	NON- RESPONSIVE
EARTH TECH OFFICIALS			
Bob Koentop	Program Manager	NON- RESPONSIVE	NON- RESPONSIVE
Dale Prckopchak	Health and Safety Director	NON- RESPONSIVE	NON- RESPONSIVE
Jeff Grant	Health and Safety Manager	(800) 688-9828 NON- RESPONSIVE	
Ron Panilla	Health and Safety	(800) 688-9828 NON- RESPONS	IVE
Marty Lalick	Health and Safety	(800) 688-9828 NON- RESPONSI\	/E

Organization/Agency	Phone
Police	911
Fire Department	911
State Police	911
Ambulance Service (EMT will determine appropriate hospital for treatment)	911

(859) 442-2300 Ext: 223 NON- RESPONSIVE

Health and Safety

Trinity Medical Center West 4000 Johnson Road St. Johns Heights Steubenville, Ohio (See Figures 2)

Mike Sherron

740-264-8000

# NOTE: HOSPITAL ROUTE MAY SHOW SIGNS FOR TRINITY MEDICAL CENTER EAST - DO NOT USE THIS FACILITY AS IT IS AN 8AM TO 5PM FACILITY NOT A HOSPITAL EMERGENCY ROOM.

Poison Control Center	(800) 632-2727
Pollution Emergency	(800) 292-4706
National Response Center	(800) 424-8802
Chem-Trec	(800) 424-9300
Title 3 Hotline	(800) 535-0202

# Table: 9 Emergency Contacts (Continued)

Public Utilities		Phone
Ohio Utilities Protection Service (OUPS)		(800) 362-2764
Columbia Gas of Ohio		(800) 282-0157
Organization/Name		
START CONTRACTOR		
Ecology & Environment, Inc. (E & E) 33 North Dearborn Street Suite 900 Chicago, Illinois 60602	Fax	(312) 578-9243 (312) 578-9345
ECOLOGY AND ENVIRONMENT, INC. CONTACTS		
E & E Regional Office (for this site)	Fax	(312) 578-9243 (312) 578-9345
E & E MEDTOX Emergency Medical Hotline	24 hour	(501) 221-0463
E & E Emergency Operations Center Hotline	24 hour	(716) 684-8940 (716) 684-8060
E & E Corporate H & S - Dr. Paul Jonmaire	NON- RES	(716) 684-8060 SPONSIVE
Regional Safety - Dean Tiebout	NON- RE	(312) 578-9243 ESPONSIVE
START Leader (Region 5) – Daniel Sewall	NON- R	(312) 578-9243 RESPONSIVE

# 8.0 SITE CONTROL

The purpose of site control is to minimize potential contamination of workers, protect the public from the site's hazards, and prevent vandalism. The degree of site control necessary depends on the site characteristics, site size, and the surrounding community.

Site work zones will be established at each work area, and if required, will be established directly prior to the work being conducted. The work zones will be drawn on site maps, posted in the site trailer/office and discussed during the daily safety meetings.

Each work area will establish three zones:

- Exclusion Zone: Contaminated work area.
- Cantamination Reduction Zone: Decontamination area.
- Support Zone: Uncontaminated, clean area.

Each zone will be periodically monitored in accordance with the air monitoring requirements established in this HASP. The Exclusion Zone and the Contamination Reduction Zone are considered work areas. The Support Zone is an area accessible to the public.

- The Exclusion Zone is the area where primary activities occur, such as sampling, remediation operations, installation of wells, cleanup work, etc. This area must be clearly marked with hazard tape, barricades or cones, or enclosed by fences or ropes. Only personnel involved in work activities will be allowed in the Exclusion Zone (also see SOP 19 in Appendix A for line entry requirements).
- The Contamination Reduction Zone is the transition area between the contaminated area and the clean area. Decontamination is the main focus in this area. The decontamination of workers and equipment limits the physical transfer of hazardous substances into the clean area. This area must also be clearly marked with hazard tape and access limited to personnel involved in decontamination. Decontamination is explained in Section 9.0 of this plan.
- The Support Zone is an uncontaminated zone where administrative and other support functions, such as first aid, equipment supply, emergency information, etc., are located. The Support Zone should have negligible potential for exposure to contaminants and is equivalent to that of background.

Employees will establish a decontamination area and Support Zone (if necessary) at the site before the commencement of site activities. The Support Zone would also serve as the entry point for controlling site access. All personnel leaving the Support Zone, in addition to the associated PPE required, will be required to wear (at a minimum) chemical-resistant outer boots when traversing the site.

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# 9.0 **DECONTAMINATION**

#### 9.1 PERSONNEL DECONTAMINATION

All PPE will be disposed of or decontaminated at the conclusion of each workday. A designated container for Tyvek suits and other disposable equipment will be located on the site. Tyvek suits, respirator cartridges, and other disposable clothing (e.g., inner gloves) will be doffed at the conclusion of each workday and replaced with new equipment before starting work the following day. Respiratory equipment, boots, outer gloves, and foul weather gear will be washed and rinsed at the end of the day and stored in sanitized bags. Decontamination of PPE will consist of manual rinses of Alconox/tap water and/or plain tap water.

#### 9.1.1 Personnel Decontamination Steps -

# MODIFIED LEVEL D

- 1. Remove coveralls and protective equipment.
- 2. Discard disposable garments.
- 3. Containerize wash and decon waters for disposal, as necessary.
- 4. Finish with personal decon/hygiene procedures to minimize exposure.

#### LEVEL C

- 1. Drop equipment off in a segregated area in the decon zone.
- 2. Wash/rinse outer suit and boots.
- 3. Wash/rinse outer gloves.
- 4. Remove outer boots.
- 5. Remove outer gloves.
- 6. Deposit disposable equipment in container for proper disposal.
- 7. Remove suit.
- 8. Remove respirator.
- 9. Remove inner gloves.
- 10. Containerize wash and decon waters for disposal, as necessary.
- 11. Finish with personal decon/hygiene procedures to minimize exposure.

#### LEVEL B

- 1. Drop equipment off in a segregated area in the decon zone.
- 2. Wash/rinse outer boots.
- 3. Wash/rinse chemical resistant outer gloves.
- 4. Wash/rinse air tank, hose, and protective suit.
- 5. Remove duct tape from boots, gloves, and face piece and discard.
- 6. Remove boot covers and outer gloves.
- 7. Remove face piece, air line, and emergency respirator.
- 8. Remove chemical resistant suit.
- 9. Remove inner boots.
- 10. Remove hard hat.
- 11. Remove inner gloves and discard.
- 12. Containerize wash and decon waters for disposal.
- 13. Finish with personal decon/hygiene procedures to minimize exposure.

# 9.2 EQUIPMENT DECONTAMINATION

Steam cleaning or pressure washing will decontaminate all heavy equipment washing (reference SOP 24 in Appendix A). Small or delicate equipment (including drum sampling devices, etc.) may be washed using a mixture of Alconox and water, and followed by a final rinse with water.

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# 10.0 PERSONNEL ACKNOWLEDGEMENT

All employees, subcontractors, and visitors must sign the Health and Safety Acknowledgement form in Appendix F before conducting field activities at this site and/or entering the Exclusion or Contamination Reduction Zones (including decontamination and restricted staging/delivery areas).

By signing this form, employees agree that:

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- 1. I have read this Health and Safety Plan and I understand the requirements of the Plan.
- 2. I will conduct work at this site in accordance with the requirements of the Health and Safety Plan.

By signing this form, subcontractors and visitors agree that:

- 1. I have read and understood the potential hazards associated with the site.
- 2. I will ensure compliance with my company's policies on health and safety in regards to entering remediation and/or restricted locations at the subject site.

# Appendix A

# STANDARD OPERATING PROCEDURES

# HEALTH AND SAFETY PROCEDURES

SUBJECT

NUMBER: PAGE: 1 OF: 2

DATE PUBLISHED: April 16, 1991

DATE REVISED: May 3, 1994

PROCEDURE NO.	
HEALTH & SAFETY PROGRAM PLAN	
PROPOSALS 2	
SITE SAFETY PLAN 3	
PROJECTS WITHOUT SITE SAFETY PLANS 4	
GENERAL SAFETY RULES	
ACCIDENT/INJURY INVESTIGATION 6	
MEDICAL SURVEILLANCE	
AIR MONITORING 8	
SAFETY TRAINING REQUIREMENTS	
DAILY SAFETY MEETINGS	
RECORDKEEPING	
PERSONAL PROTECTIVE EQUIPMENT (PPE)	
RESPIRATORY PROTECTION EXCEPT SCBA	
SELF-CONTAINED BREATHING APPARATUS (SCBA)	
WORK ZONES	
DECONTAMINATION	
HEAT STRESS	
CONFINED SPACE ENTRY	
LINE ENTRY	
HOT WORK	
LOCKOUT/TAGOUT	
EXCAVATION 22	



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# HEALTH AND SAFETY PROCEDURES SUBJECT: PAGE: 2 OF: 2 NUMBER: Table of Contents DATE PUBLISHED: April 16, 1991 DATE REVISED: May 3, 1994 HIGH PRESSURE WASHER (LASER) ...... 24

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	HEALTH AND SAFETY PROGRAM PLAN	DATE PUBLISHED:April 23, 1991		
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This procedure serves to describe key elements of the health and safety program at EARTH TECH. The policies and procedures that follow are the vehicle through which this safety program is implemented as well as providing the health and safety organization a tangible audit measure.

#### 1.0 SAFETY ORGANIZATION

The safety program for EARTH TECH is administered by a corporate Health and Safety Manager. The corporate Health and Safety Manager reports directly to the corporate president. The site safety officers report to the corporate Health and Safety Manager.

The Health and Safety Department is responsible for establishing safety procedures and protocols. The operating arm of the company is responsible for administration of the safety procedures and protocols.

#### 2.0 SAFETY RESPONSIBILITY

At EARTH TECH the safety and protection of employees, clients, and the community is the first priority. This concern for safety is not exclusive to field operations but extends to the office surroundings, laboratories, and shop facilities. If a project or activity is unsafe, this activity or project will not be attempted until conditions are made safe.

The operating president and operating vice presidents are the primary operational safety officials in the company. The responsibility for operational safety is delegated to the division managers, project managers, shop supervisors, and site supervisors. The Site Supervisor and the Shop Supervisor are the primary safety officials at the working level.

Health and Safety Department personnel are responsible to ensure that the primary safety officials are carrying out operational safety in an effective manner.

Every employee, regardless of job title, shares the responsibility for safety. Both favorable and unfavorable safety reports and audits will be entered into an employee's personnel file. These will be reviewed and weighed during salary and promotion evaluations.

#### 3.0 PRIMARY SAFETY DEPARTMENT FUNCTIONS

The primary functions of the Health and Safety Department follow:

- \$ Administer medical surveillance program;
- \$ Assists with health/safety portions of proposals;
- \$ Prepare site safety plans;
- \$ Provide safety training/maintain training records in coordination with the training department;
- \$ Auditing safety procedures and protocols at project sites, shops, and offices;
- \$ Maintain OSHA accident investigations and records;
- \$ Verify OSHA compliance under 29 CFR 1910 and 1926;
- \$ Verify EPA compliance under 40 CFR 364, 355, and 370;



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- \$ Assist with preparation of safety protocols for specific tasks;
- \$ Provide site safety officers, as required;
- \$ Provide safety literature;
- \$ Promotes safety and health within the company; and
- \$ Act as internal health and safety consultants.

In an effective safety organization, the role of the safety professional is as an advisor and consultant and the role of assigned health and safety personnel should be directed to that effort.

#### 4.0 REGULATORY COMPLIANCE

The policy of this company will be to comply with all client, local, state, and federal regulations to the best of our ability. It is the responsibility of all personnel to perform all work in full compliance with regulations. Health and Safety personnel will bring any concern regarding health and safety compliance to the attention of supervisory operating personnel immediately.

#### 5.0 SAFETY GOALS

The goal of the Health and Safety Department is to ensure a safe working environment, protect workers from harm, and protect the company from that liability associated with an unsafe working environment.

Other goals are to eliminate workplace accidents, gain worker acceptance through cooperation and training and provide our clients with a responsible, well-trained, safety oriented, work force.

#### 6.0 SAFETY TRAINING

#### Hazardous Waste/Materials Field Workers

All EARTH TECH field workers will receive the 40-hour training required for hazardous-waste workers/emergency response personnel outline in 29 CFR 1910.120(e). All persons completing this training must pass a written examination with a minimum score of 70 percent to demonstrate that they adequately understand the material. Supervisory personnel will complete a minimum of 8 additional hours of training. Following training, the 3-day supervised field work required by 29 CFR 1910.120(e) will be completed and documented.

Annually, all EARTH TECH field workers will complete the refresher training required by 29 CFR 1910.120(e).

All training will be documented by records maintained by the Industrial Hygiene Department.



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# **Daily Field Safety Training**

At each active work site, a daily safety training session will be conducted by the site supervisor or his designee in order to inform all personnel of the expected hazards at the site and how best to eliminate or protect from those hazards. A specific safety topic should also be addressed. All safety training will be documented in a site safety log for the site including the topics addressed and the personnel present. Prepared forms are also available to document the daily meetings.

# Snop Personnel

All shop personnel will receive training in accordance with 29 CFR 1910.1200 Hazard Communication (compliance date May 23, 1988). This standard mandates worker training for chemical hazards in the workplace.

#### First Aid/CPR

It will be a company goal that at least 10 percent of the work force receives First Aid and CPR training from the Red Cross on an annual basis. This should provide approximately 20 percent of trained personnel at each work site.

#### 7.0 SITE SAFETY PLAN

A written site safety plan is required at all EARTH TECH work sites. This site safety plan should generally conform to that required by 29 CFR 1910.120(b)(1)(n) "Site Specific Safety and Health Plan Chapter".

Generally, a representative of the Health and Safety Department will prepare the safety plan before site work commences. In an emergency, however, the site supervisor or acting site safety officer may be required to generate an interim site safety plan until a representative of the Health and Safety Department arrives on scene or develops a plan.

#### 8.0 MEDICAL SURVEILLANCE

All employees who perform work at hazardous-waste sites or perform emergency response will be enrolled in the EARTH TECH medical surveillance program. This program conforms to 29 CFR 1910.120(f)-Medical Surveillance. A copy of the Medical Surveillance Program is included as Health and Safety Procedure No. 7.

#### 9.0 ACCIDENT INVESTIGATION

All accidents will be thoroughly investigated by the supervisor of the person(s) involved in the accident. The employee, the supervisor, and the site safety officer (if assigned) will sign the accident investigation form. The form must be submitted to the corporate office to comply with OSHA requirements. Instructions for completing the investigation are found on the form. A copy of the EARTH TECH Incident Investigation Form is in Health and Safety Procedure No. 6.



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Serious accidents such as those involving hospitalization or injuries requiring more than one visit to a physician may be investigate by the Health and Safety Department. The Vice President or Health and Safety Manager may also request that a specific written accident investigation be conducted in the event of an unusual or serious injury or accident.

#### 10.0 SITE INSPECTIONS

Weekly inspections will be made of the work area. The inspection will be made by the supervisor, his designated alternative, or the site safety officer. Discrepancies found during an inspection will be corrected as soon as practicable. Serious safety violations will be corrected immediately. An inspection record will be maintained in the site safety log. The inspection will be guided by the site safety inspection check-off list.

Additionally, the corporate Health and Safety Manager will make periodic unannounced inspections of work sites on his own discretion or at the request of a worker.

#### 11.0 FIRST AID

Each work site must be evaluated to determine the potential requirement for medical emergencies. At a minimum, an industrial first aid kit will be provided as well as a Red Cross trained employee. We will strive to ensure that a minimum of 10 percent of the employees are first aid and CPR trained and their training is current. Supervisors will ensure that the emergency telephone numbers are correct. Additionally, a map indicating the route to the designated hospital emergency room will be posted in the office trailer. In the event the work site is remote, the supervisor should evaluate the need for an Emergency Medical Technician and/or on site ambulance service.

#### 12.0 SITE SAFETY OFFICER

#### Responsibility of the Site Safety Officer

The Site Safety Officer, in conjunction with the corporate Health and Safety Manager, is generally responsible to prepare the site safety plan and to ensure compliance with the site safety plan. He is also responsible to ensure that personnel are made aware of the hazards presented by each job site. The best way to communicate these hazards is by requiring that all personnel read and initial or certify that they have read and understand the plan. The initial site safety meeting should address the content of the site safety plan. The site safety plan will be reviewed with personnel new to the project.

#### Authority of the Site Safety Officer

Health and Safety personnel have the authority to suspend any activity or project they deem to be inherently unsafe. Work will not resume until the project or activity is brought into compliance. Any disputes over such matters will ultimately be decided upon by the corporate Health and Safety Manager and the division Vice President.



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#### 13.0 REVIEW OF HEALTH AND SAFETY STATISTICS

On a periodic basis as follows, managers will be required to review accident statistics for their divisions/personnel. These statistics will be furnished to managers by the corporate Health and Safety Department.

# Quarterly

S Accidents by division (OSHA recordable)

### Ar nually

- \$ OSHA 200 Form (post for month of February)
- \$ Accident/injury rates by division

# 14.0 SPECIFIC WRITTEN SAFETY PROCEDURES/PERMITS

# Safety Procedures

The following written safety procedures have been prepared in order to ensure that the operation is conducted safely and/or to ensure that the operation is conducted in full compliance with OSHA/EPA regulations.

A I EARTH TECH personnel will be aware of these safety procedures and comply fully.

### **Permits**

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The following procedures require that a permit be completed before the work can be undertaken. The permit procedure is required in order that operating personnel can ascertain that the specific task can be safely accomplished after requirements are met.

- \$ Confined Space Entry
- \$ Hot Work Permit
- \$ Line Entry

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HEALTH AND SAFETY PROCEDURES					
SUBJECT:	PROPOSALS	NUMBER: 2	PAGE: 1 OF: 1		
		DATE PUBLISHED:October 2, 1992			
		DATE REVISED:May 3, 1994			

#### 1.0 POLICY

Health and safety considerations are to be addressed in every proposal so that the projects costs may be accurately estimated.

#### 2.0 PURPOSE

This procedure describes requirements for providing health and safety input into the proposal preparation process.

# 3.0 REQUIREMENTS

- 3.1 The proposal writer will consult with the regional Health and Safety Manager in order to identity the anticipated level of protection and any other safety-related requirements.
- 3.2 The documented titled "Health and Safety Guidelines" will normally be included in the proposal package.
- 3.3 The corporate Health and Safety Manager will prepare (or, as a minimum, review) any site specific safety plan required for a proposal.

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# HEALTH AND SAFETY PROCEDURES SUBJECT: NUMBER: 3 PAGE: 1 OF: 2 DATE PUBLISHED:April 23, 1991 DATE REVISED:May 17, 1994

#### 1.0 POLICY

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A site safety plan will be prepared for all projects prior to initiation of work. Exceptions are act vities described in health and safety procedure No. 4, "Projects Without Site Safety Plans".

#### 2.0 PURPOSE

This procedure outlines the minimum requirements for preparing a site safety plan.

#### 3.0 GENERAL REQUIREMENTS

- 3.1 The Project Manager is responsible for assuring that a site safety plan is prepared.
- 3.2 Employees involved in working on projects involving hazardous materials will be trained in the contents of the site safety plan prior to work on site.
- 3.3 The site safety plan will be available on the work site for inspection by employees, clients, or OSHA personnel.
- 3.4 The site safety plan will address as a minimum the following items:
  - Names of key personnel responsible for site health and safety including the Site Safety Officer and the Site Supervisor;
  - An area map showing the site;
  - Establishment of work zones, including a site map;
  - A health and safety hazard evaluation for each site task and operation, including chemical and physical hazards;
  - Personal protective equipment requirements;
  - Contaminant monitoring requirements this includes frequency and type of air monitoring, techniques and instrumentation to be used, and methods of maintenance and calibration of the instrumentation;
  - Actions to be taken if monitoring indicates that the level of protection is not adequate;
  - Decontamination procedures;
  - A contingency plan for safe and effective responses to emergencies including necessary personal protective equipment and other equipment;



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	Site Safety Plan	DATE PUBLISHED:April 23, 1991	
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- Phone numbers of police, fire, and medical facilities as well as maps to designated medical facilities;
- Medical surveillance;
- Training requirements;
- Confined space entry requirements, if applicable;
- Material Safety Data Sheets (MSDSs) for chemicals present on site; and
- Site specific standard operating procedures.
- 3.5 All site safety plans will be reviewed by the Health and Safety Manager.

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HEALTH AND SAFETY PROCEDURES				
SUBJECT:		NUMBER: 4	PAGE: 1 OF: 1	
Projects Without Site Safety Plans	Projects Without Site Safety Plans	DATE PUBLISHED:April 23, 1991		
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#### 1.0 POLICY

Site safety plans will be developed for all projects which may involve exposure to hazardous materials. Certain activities, however, may occur prior to preparation of the site safety plan.

#### 2.0 PURPOSE

This procedure describes minimum requirements for conducting activities where no site-specific safety plan exists.

### 3.0 REQUIREMENTS

- 3.1 Only on-site activities which do not involve exposure to hazardous materials may be conducted prior to preparation of the site safety plan. Such activities may include pre-bid job walks or site surveys.
- 3.2 If a possibility for exposure exists prior to preparation of the site safety plan, the operation must be approved by the corporate Health and Safety Manager, who will specify appropriate protective measures including personal protective equipment.
- 3.3 Employees performing work on sites prior to issuance of the site safety plan or on site not requiring a site safety plan are to comply with all provisions of these procedures, including medical surveillance and training.
- 3.4 As a minimum, employees will obtain and comply with any client health and safety procedures which may apply. These may be in the form of standard operating procedures, health and safety procedures, or contract specifications.

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GENERAL SAFETY RULES		DATE PUBLISHED:April 23, 1991		
		DATE REVISED:May 3, 1994		

#### 1.0 POLICY

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The following rules generally apply in all areas of safety.

#### 2.0 PURPOSE

This procedure provides project managers and personnel with a list of fundamental safety rules not specifically covered in other health and safety procedures.

#### 3.0 GENERAL HEALTH AND SAFETY RULES

- 3.1 Each office/project site will have the appropriate OSHA poster (state or Federal) posted prominently.
- 3.2 Each employee, as a condition of employment, is required to comply with the health and safety procedures and the site safety plan governing in each area the employee is required to work.
- 3.3 Project managers are to review records of each employee to be assigned to work on projects involving hazardous materials and assure that all requirements pertaining to health and safety such as medical surveillance and training are in compliance.
- No one will initiate work on a project involving hazardous materials until appropriate training as required by regulation, contract and/or health and safety procedures have been implemented.
- 3.5 All employees are directed to immediately bring to the attention of the Site Supervisor or site safety officer any unsafe condition, practice or circumstance.
- 3.6 The following practices are expressly forbidden during operations on hazardous materials sites:
  - Smoking, eating, or drinking while on site except in designated areas;
  - Geral Ignition of flammable or reactive materials;
  - Entry on site without proper safety equipment;
  - Conduct of operations on site without backup personnel as described in the site safety plan;
  - Wearing of facial hair which may interfere with a respiratory seal on a job site which may require respiratory protection; and
  - Wearing of contact lenses on a hazardous materials site.



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- 3.7 A daily safety meeting will be held at hazardous materials sites to review site hazards, changes in levels of personal protective equipment, special safety precautions, and emergency response per Health and Safety Procedure No. 10.
- 3.8 Every accident is to be reported to the Site Supervisor immediately, whether or not anyone is injured.
- 3.9 Employees may not alter or attempt to repair any item of safety equipment unless specifically authorized and qualified.
- 3.10 An employee must not attempt to move or lift heavy or bulky objects beyond his capacity.
- 3.11 Possession or use of intoxicants or drugs on company premises or job sites is prohibited. Employees may not report for work or perform duties while under the influence of intoxicants or drugs. Prescription drugs are to be reported to the Site Supervisor and shall not impair the ability of the worker to work safely.
- 3.12 Walking under or working under a suspended load is not permitted.
- 3.13 Legible and understandable precautionary labels will be prominently affixed to containers or raw materials, intermediates, products, by-products, mixtures, scrap, waste, debris, and contaminated clothing, per DOT, EPA, OSHA, or other applicable regulations.
- 3.14 A sufficient number of fire extinguishers, as determined on site with a minimum rating of 10B:C, will be strategically located throughout the areas where active work is progressing so as to limit the travel distance by personnel to less than 75 linear feet.
- 3.15 All personnel will avoid contact with potentially contaminated substances. Walking through puddles or mud, kneeling on the ground, or leaning against drums is to be avoided.
- 3.16 Monitoring equipment will not be placed on potentially contaminated surfaces.
- 3.17 Personnel on site will use the "buddy" system (pairs). Buddies should prearrange hand signals for communication in case of lack of radios or radio breakdown. Communication or visual contact will be maintained between crew members at all time.
- 3.18 Contaminated protective equipment will not be removed from the regulated area until it has been cleaned or properly packaged and labeled.
- 3.19 Employees will not be permitted to exit the contamination reduction zone until contaminated clothing and equipment have been removed and employees have washed their hands and face with soap and water. The only exception is in an emergency situation.
- 3.20 Removal of materials from protective clothing equipment by blowing, shaking, or any other means which may disperse materials into the air is prohibited.



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- 3.21 Portable or fixed emergency shower/eyewash stations may be required by the site safety plan for the regulated area.
- 3.22 A deluge shower or hose and nozzle will be available in the contamination reduction zone to wash down heavily contaminated personnel before doffing protection clothing.
- 3.23 As appropriate, equipment on site will be bonded and grounded spark proof, and explosion resistant. Ground fault interrupters will be utilized. See Health and Safety Procedure No. 27.
- 3.24 Guard rails and toe boards will be in place for all work on elevated platforms exceeding 6 feet in height.
- 3.25 Accidents and injuries can and do occur in office environments. Attention and safety awareness are important in offices as well as job sites. Some commonly violated office safety rules include:
  - Aisles, passageways or corridors are not to be blocked at any time;
  - Desk drawers, cabinet doors and file cabinet drawers are to be kept closed when not in use;
  - Use a proper platform, not a swivel chair for reaching in places; and
  - Fire extinguishers are to be readily available in each office and an emergency evacuation plan implemented.

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# HEALTH AND SAFETY PROCEDURES SUBJECT: ACCIDENT/INJURY INVESTIGATION DATE PUBLISHED:April 16, 1991 DATE REVISED:May 3, 1994

#### 1.0 POLICY

All injuries and accidents will be reported promptly to the site supervisor and documented.

#### 2.0 PURPOSE

This procedure provides for reporting and documenting accidents, injuries, and work-related illnesses.

#### 3.0 PROCEDURE

- 3.1 Reportable incidents include, but are not limited to:
  - Injuries to personnel of any magnitude;
  - Tool or equipment failure which results or could result in serious injury;
  - Fire or explosion of any magnitude;
  - Exposure of unprotected personnel to toxic agents;
  - Wehicle accidents; and
  - Any damage to client or private property.
- 3.2 All injuries/illnesses, no matter how minor they appear, are to be reported to the employee's immediate supervisor. The supervisor should then see to it that the incident is logged and properly reported.
- 3.3 Under no circumstances should an injured employee drive himself/herself to the hospital, clinic, etc. An employee with minor injury may be transported by car after first aid treatment is given. The employee who transports the injured person should be trained in first aid and CPR whenever possible. Any injury that is not minor, or when in doubt of severity of injury, should be transported by ambulance.
- Injured employees who require medical treatment or in which the employee was taken to a doctor, hospital, clinic, etc., should not be allowed to resume work without a written return to work and/or any work limitations letter. Should a statement, such as "light duty" be given, corporate Health and Safety will call the treating physician to determine the exact restriction that is needed. It is essential the treating physician understands the type of work the employee normally performs and that alternate work is available to meet work restrictions.
- 3.5 The CEO of HazWaste, President of the company, division Vice President, and corporate Health and Safety Department are to be notified immediately of any lost time accident. Notice is to be made by telephone or other available means.

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3.6 All bills and receipts for medications and pharmacy supplies pertaining to work related injuries should be sent to the employees assigned division to the attention of the person who handles worker's compensation claims. The employee should write on the bill or receipt the date of injury and diagnosis.

#### 4.0 FORMS AND REPORTING PROCEDURES

#### 4.1 Injury/Illness Log

- Injury/Illness Log is to be kept at the location where first aid treatment is given at all EARTH TECH project sites. All injuries, no matter how minor they appear, are to be logged. Minor injuries such as small cuts, scrapes, small first degree burns, and splinters that require only first aid treatment, are entered on this log only. Any incident that requires the completion of the Incident Investigation Report, as described below must also be logged. Maintaining this log will help in meeting OSHA recordkeeping requirements and in responding to minor incidents before they become major. An example of a properly completed log is attached. On the last work day of each week, a copy of the log is to be faxed to:
  - Corporate Health and Safety Manager

(If a fax is not available, notify the home office by the same method time card information is sent or telephone the corporate Safety Manager.)

The original log should be retained in site records.

#### 4.2 <u>Accident Report</u>

- Incident Investigation Report (Accident Report) to be completed in the following work-related circumstances: (this report is required by OSHA).
  - Any work-related back injuries;
  - All work-related chemical exposures;
  - Any work-related injury/illness which involves medical treatment (treatment by doctor, hospital, clinic, chiropractor, dentist);
  - Any work-related accident that results in death of an employee;
  - Any incident that involves property damage but not necessarily employee injury; and
  - Any work-related incident (near miss) in which an injury could have occurred and that attention is needed to prevent similar incidents from occurring and preventing an injury/accident.

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Note: Minor injuries such as scrapes, small cuts, small splinters that require first aid treatment only, do not require completion of the Incident Investigation Report. However, should condition of injury change and require medical treatment, then a report must be completed. If in doubt as to how to classify an injury (first aid or medical), complete the Incident Investigation Report.

The Incident Investigation Report is to be completed the day of the injury/incident.

#### The Site Supervisor shall:

- Notify the corporate Health and Safety Manager by telephone;
- Complete the report within 24 hours of the occurrence;
- Have involved employee(s) review and sign the report;
- Send original report to the corporate Safety Manager; and
- Retain a copy of the report for site records.

#### The Project Manager or supervisor shall:

- Notify the injured employee's divisional vice president and company president of the injury incident;
- Obtain additional information as needed for investigation of the occurrence (photographs, diagrams, witness statements, doctor slips, etc.);
- Send a copy of the report to the division secretary handling worker's compensation of the injured employee;
- Forward all original reports to corporate Health and Safety for retention in the employee's medical file; and
- Retain a copy for his/her file.

#### For Lost Time Injury

#### The Project Manager or supervisor shall:

Complete the <u>Notice of Lost Time Injury</u> and fax a copy to Divisional vice president and company president and corporate Health and Safety within 24 hours of the incident.

The Project Manager shall:

HEALTH AND SAFETY PROCEDURES				
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Conduct a joint site inspection with the Safety Manager and submit a brief report to his division vice president and corporate health and safety manager detailing the major cause(s) of the accident and corrective action implemented within five days of the incident.

#### 4.3 Return to Work/Authorization for Release of Medical Records

The following two forms are to be completed whenever and injured/ill employee is given treatment at a hospital, clinic, doctor's office, etc. These forms are necessary for obtaining additional information to be used in determining OSHA recordability and filing of worker's compensation claims. Both original forms are to be attached to and submitted together with the Incident Investigation Report.

- Return to Work form is to be completed by the treating physician. The employee shall return the original form to his supervisor prior to returning to work or within 24 hours of a lost time incident. No employee is to be allowed to return to work following treatment of an injury/illness without this completed form. Restrictions given by the physician are to be followed. The supervisor shall contact the treating physician or Corporate Health and Safety should there be any question regarding an employee's ability to return to work.
- Authorization for Release of Medical Records is to be completed by the supervisor or treating agency and signed by the employee. This form is required to obtain doctor's reports, emergency room records, x-ray reports, lab reports, etc., pertaining to the work-related incident. The original form is to be attached to the Incident Investigation Report.

By following these guidelines and procedures, we hope to ensure accurate recording or work related injuries and illnesses and improve filing of workers compensation claims.

# **Supervisor's Report of Incident**



This is an offic at document to be initiated by the injured employee's Supervisor. Please answer all questions completely. Fax to your Region EHS Manager within 24 hours of the injury. See reverse side for instructions.

Section 1: Employee (Must complete each item or processing delays will occur) - Print Clearly SCMS Claim# WC Location Code: (877)261-8926 S.S. No. Sex Birth Date Employee Data Marital Status Dependents Phone Injured's Name City State Zip Code Home Address Dept No. Office Location Address Job Title ∟ Injury ☐ Vehicle Injury □ Near Miss Hire Date Hourly Wage Illness Section 2: Supervisor (Must complete each item or processing delays will occur) - Print Clearly Date Reported To Whom Date of Incident Time Job Assignment at Time of Incident Time Shift Began Client Name Did injured leave work? When? Exact Location & Address of Incident Has injured returned to work? U Yes Did employee miss a regularly scheduled shift? U Yes Doctor/Hospital Name Address of Hosp. Yes No Statements Attached Witness Name **Body Part** Nature of Injury Medical Attention Describe Incident What caused the incident? Corrective Action(s) to Prevent Future Occurrence: Supervisor/Foreman (Print Name) Telephone Signature Date Section 3: Manager Comments on incident and corrective action Signature Telephone Manager (Print Name) Date Section 4: Environmental, Health and Safety Concur with action taken? Yes No. Remarks: Incident only First aid OSHA Classification Pending L OSHA Recordable Ves No Lost work days Days of restricted activity Fatality EHS Professional (Print Name) Signature Telephone Date

# Supervisor's Report of Incident Instructions For Completion

The following types of incidents must be reported using this form:

- 1. Occupational Injury or Illness (includes first aid only, medical treatment, hospitalization, fatality)
- 2. Vehicle Accident Injuries
- 3. Near Miss (incident where employee(s) could have been injured)

#### **INSTRUCTIONS**

#### Immediate:

- 1. Employees must report such incidents to their Supervisor immediately.
- The Supervisor must complete Sections 1 and 2, Employee Data and the Supervisor Section of the SRI. Incomplete
  items will delay timely processing. Any work-related injury or illness that requires medical treatment or care will require
  notifying SCMS at 877-261-8926.
- 3. The Supervisor must verbally notify his/her Manager, who in turn must sign **Section 3, Manager**, of the SRI. To avoid delaying SRI process, a separate copy of the SRI with the Manager's signature can be faxed within 3 days to the REHSM.
- 4. The Supervisor must verbally notify his/her REHSM with a follow-up SRI faxed within 24 hours (see below for fax numbers). The REHSM will review and complete Section 4, Environmental Health and Safety, and fax the SRI to the WCA at 804-515-8313.
- 5. For near-miss situations that could have resulted in an injury to an employee, the Supervisor must notify his/her Manager (see Item 3 above) and the REHSM with a follow-up SRI faxed within 24 hours.

#### **PRIMARY CONTACTS**

East REHSM: Dale Prokopchak, CIH, CSP WCA:

Telephone: 804-515-8556 Telephone: 804-515-8557 Fax: 804-515-8313 Fax: 804-515-8313

Pager: 877-830-1981

Midwest REHSM: Jeff Grant, CIH

Telephone: 616-940-4426

Fax: 616-940-4396

Cell Phone: 734-516-5232

West REHSM: Bob Poll, CIH, CSP

Telephone: 562-951-2242

Fax: 562-495-9257

Cell Phone: 562-884-1414

EHS101-F1 Revised July 19, 1999

This report contains information protected by the Privacy Act.

# "Job Hindrances Interrupt or Interfere with the Orderly Progress of the Job." SUPERVISOR'S INVESTIGATION REPORT

⁻mployee Name	Age	Tim	e	Date	
Department-Shift	Job	Hov	v long on this job?		
<del></del>		<del></del>	<del></del>	**	<del></del>
WHAT HAPPENED? (Describe what to	ook place or what caused you	to make this inves	tigation.)		
		<del></del>			
					<del> </del>
WHY DID IT HAPPEN? (Get all the fac	ts by studying the job and situ	ation involved. Qu	Jestion by use of WHY-WHA1-WHEF	CE-WHEN-WHO-HOW	···
		<u>.</u>			
		<u> </u>			
WHAT SHOULD BE DONE? (Determin	e which of the 12 items under	EMP require addit	tional attention.*)		
				<del></del>	
<del></del>				=	<u>.</u>
WHAT HAVE YOU DONE THIS FAR? (	Take or recommend action, de	pending on your a	nuthority. Follow up - was action eff	ective?)	<del></del>
					·
		<del></del>		<del> </del>	
		<del></del>			- <del></del>
HOW WILL THIS IMPROVE OPERATIO	NS? (Objective: Eliminate job	hindrances.)	<u> </u>		<del></del>
		<del></del>			
			<del> </del>	<del>-</del>	
				<del></del>	
INVESTIGATED BY		DATE	REVIEWED BY		DATE
EQUIPMENT Select Arrange Use Maintain	MATERIAL PEO Select Place Handle Process	PLE Select Place Train Lead			

	ACCIDENT' INJURY/ILLNESS'	-	UNUSUAL OCCURRENCE NEAR MISS
Project no.:		Project phone no.:	
Project location:	<del> </del>		
Employee's full name:			Number:
If subcontractor, give r			
Home address - Stree	4.		
	City/State/Zip:		
	Phone number:		·- <u>-</u>
Date of birth (m/d/y): _		<i></i>	5) SSN:
Job title:		7) Assigned di	vision.
Date and time of occu	пепсе:		
Estimated/actual date	of return to work:		
Describe the apparent	t extent of injury or illness a	and parts of body affected	(laceration, burn, fractureright lower leg, left index finger):
Describe treatment giv	ven (x-ray, stitches, etc.)	f hospital or doctor, give n	ame, address, and phone number and attach return-to-work slip:
Did a chemical exposu	ure occur? If yes, what kno	own contaminants were pre	esent? What type of exposure occurred? (Inhalation, ingestion, skin contact, etc.)

# **INCIDENT INVESTIGATION REPORT (continued)**

<sup>1</sup> 5)	Describe fully hav accident happened, give causes and results. Attach another sheet if necessary:					
N <sub>i</sub> gra						
- Tra						
16)	Exact location v/here incident occurred:					
?7)	Names and addresses of witnesses to the incident:					
18)	Were emergency procedures adequate?					
<sup>-</sup> 9)	Who was directly supervising the work?					
20)	Work schedule at time of incident: Hours per day Days per week					
21)	Level of personal protective equipment utilized at time of incident: (circle) A B C D					
22)	What direction or training had been given on the task?					
23)	How can you or the company prevent similar incidents from happening again?					
24'	Did personal protective equipment fail (Tyvek tom, glove ripped, respirator failed, etc.) Describe:					
25)	What action has or will be taken to prevent similar occurrences?					
26]	Additional comments:					
Signature	(Employee)	Date:				
*(iiii) Signature		Date:				
	(Site Supervisor)					
Signature	(Safety Supervisor)	Date:				

<sup>\*</sup> Fill out form completely and accurately. Within 48 hours, send a copy of the completed form to the manager, and send original report to Corporate Health and Safety. Retain a copy at the job site. Attach to report any related information (photographs, doctor slops, witness statements, etc.) The injured employee shall contact their home division office for further instruction and forms to be completed on work-related injuries/illnesses.

# **RETURN TO WORK**

Physicians Please	complete and return the original form to the employee.	
Employee's Name:		* wagi-
is able to:		
	Return to regular work	
<del></del>	Return to work with the following restrictions:	
	Lifting to Standing Sitting	
	Clean office work only Other	
	Restriction is effective until	
	Unable to work estimate return to work date	
Signature:		M.D.
Address:		

<sup>\*</sup> Employee must present this form to his supervisor prior to returning to work.

# **AUTHORIZATION FOR RELEASE OF MEDICAL RECORDS**

I, (print full name)			
hereby author ze	(inclividual or organization holding records)		
to release to EAF	RTH TECH a copy of all medical records pertaining to my injury/illness of		
	ture of universal linese)		
	ture of injury/illness)		
Please send reco	ords to:		
(Signature)			
(Date)			
Distribution:	1) Original to Corporate Health and Safety		
	2) Copy to Site File		



# NOTICE OF LOST TIME INJURY

Please 1	ype or Print		
Employee	e Name:	Employee No.:	
Superviso	or's Name:		
		Time:	
Brief Des	cription of Incident and Injury:		
Immediat	e Corrective Action:		
Tentative	Follow-up Corrective Action:		
•			
Signature	):		Safety Manager
Date:			
pc:	1)		
	2)		
	3)		

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HEALTH AND SAFETY PROCEDURES				
SUBJECT:		NUMBER: 7	PAGE: 1 OF: 5	
	MEDICAL SURVEILLANCE	DATE PUBLISHED:October 2, 1992		
		DATE REVISED:M	lay 3, 1994	

#### 1.0 POLICY

The medical surveillance program has been established to ensure that personnel are capable of performing their assigned activities, and that the health of the employee is not compromised by potential exposure to chemical or physical agents found at work sites. This program is designed to support and monitor the effectiveness of the primary health and safety goal of controlling worker exposure to hazardous materials.

#### 2.0 PURPOSE

This procedure describes the EARTH TECH medical surveillance program requirements.

#### 3.0 PARTICIPATING EMPLOYEES

- 3.1 A medical surveillance program is required for employees who are or may be:
  - Exposed to substances above permissible levels for 30 or more days per year; or
  - Required to wear a respirator for 30 or more days per year; or
  - Exposed above permissible levels in accidents or emergency situations.
- 3.2 Employees who have a potential site exposure risk, work with potentially hazardous materials, are required to wear respiratory devices, or are required to be monitored under other regulations (e.g., DOT drivers) will be monitored.
  - Other personnel may be monitored on a case-by-case basis. All employees designated to participate in this program are required to do so as a condition of employment.
- 3.3 Employees who do not fall within the above categories will not be included in the program.

#### 4.0 MEDICAL SURVEILLANCE PROGRAM

The medical surveillance program consists of four parts; a pre-employment medical examination, annual medical examination, project-specific monitoring, and/or medical examination (periodic), and exit medical examination.

Regional managers are responsible for providing to the physician:

- A copy of the OSHA regulation relating to hazardous waste site workers and its appendices (29 CFR 1910.120);
- Description of employee's duties as they relate to exposures;
- Description of the personal protective equipment to be used;
- Information from previous examinations which may not be readily available to the physician; and



# HEALTH AND SAFETY PROCEDURES SUBJECT: MEDICAL SURVEILLANCE DATE PUBLISHED:October 2, 1992 DATE REVISED:May 3, 1994

A copy of the medical program.

#### 4.1 Medical Form

The medical/occupational history and physical form is to be used for all medical examinations. This form incorporates personal, family, occupational history, physical examination information, acknowledgement and authorization to release medical records, and medical certification.

The medical certification form will be used to inform clients that our employees are physically fit to work in hazardous waste operations.

#### 4.2 Pre-Employment Medical Examination

The purpose of the pre-employment examination is three-fold. First, the examination should identify any pre-existing illness or medical problem which will exclude a prospective applicant from employment. Second, the examination should determine if a candidate possesses sufficient physical capabilities to wear respiratory and personal protective equipment, work at heights, work in climatic extremes (heat and cold), and perform strenuous physical labor. Third, the medical information (SMAC-23, EKG, PFT, chest x-ray, urinalysis, audiogram) will serve as a baseline (pre-exposure) against which the yearly or project-specific monitoring can be compared to provide a mechanism for early detection of toxic substance exposure, as well as determine the employee's general fitness for potential exposure to chemicals and physical agents.

During the performance of this pre-employment exam, the employee will complete a preemployment medical history and sign the medical records release.

In the pre-employment examination, the examining physician will determine if the prospective employee is capable of safely performing the job for which he/she is applying. At the conclusion of the pre-employment examination, the examining physician will carefully review the medical history and result of the physical examination along with laboratory reports, and then determine if the prospective employee is physically capable of safely performing the intended tasks.

Upon a satisfactory review of results, the physician will complete and sign the medical certification/rejection. The physical examination section and medical certification/rejection section must be completed by the physician. A written report of the occupational and medical history, physical exam, and all lab work is required.

The pre-employment examination will consist of the following:

Occupational and medical history;

Physical examination;

Audiometric test;



# HEALTH AND SAFETY PROCEDURES SUBJECT: NUMBER: 7 PAGE: 3 OF: 5 MEDICAL SURVEILLANCE DATE PUBLISHED:October 2, 1992

→ Urinalysis;

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→ Blood test;

Chest x-ray;

Pulmonary functions test; and

Written report.

#### 4.3 Annual Medical Examination

The annual examination will include an updated medical history, including any occupational exposure from the previous year, and a detailed physical exam featuring the same components as the pre-employment examination. The physician will pay particular attention when comparing the bio-chemical parameters to help ensure no recognized symptoms of toxic exposure have developed during the past year. The physician will complete and sign the medical certification/rejection section. A written report of the occupational and medical history, physical exam, and all lab work is required.

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#### 4.4 <u>Driver's Medical Examination</u>

Personnel who drive trucks for the company must annually pass a U.S. Department of Transportation physical. The forms for this examination can be obtained from the Health and Safety Department and will routinely be distributed to the division offices. Driver physicals will consist of a short history and physical examination.

#### 4.5 Project Specific Monitoring and/or Medical Examination (Periodic)

As required for a specific job, when requested by a client, or as deemed necessary upon advice from the Industrial Hygiene Department, a specific medical test(s) may be required for any individual. Additionally, any time an actual exposure above the OSHA permissible exposure limit (PEL) occurs, the employee may be tested for that material to document effect(s) of the exposure.

#### 4.6 Exit Medical Examination

An exit medical examination is required at termination of employment or reassignment to an area where the employee would not be covered. The physician should pay particular attention to the condition of skin and document employee comments as to state of health. A written report of the occupational and medical history, physical exam, and all lab work is required.

#### 5.0 MEDICAL RECORDS

The Health and Safety Department will maintain a medical record for each employee consisting of the following:

Pre-employment, annual, project specific monitoring (periodic), and exit medical histories, including job description and past occupational exposures;



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- The results of all medical examinations including pre-employment, annual, periodic testing, including x-ray, examination, and all specific biological monitoring;
- Medical opinions, diagnosis, progress notes, and recommendations of the doctor;
- Description of treatments and prescriptions; and
- Employee medical complaints.

#### 5.1 <u>Confidentiality</u>

The information contained in the employee medical files will be open to review and usage by Health and Safety personnel and examining and consulting physician(s).

Records must be maintained in a locked filing cabinet with access limited to the individuals described above. Upon termination of service, resignation, retirement, or death, the records will be retained for 30 years in accordance to 29 CFR 1910.20.

5.2 Employee's Access to Medical Records

In accordance with 29 CFR 1910.20, all employees may have access to their medical records for the purpose of examination and copying. Access will be granted only to the employee or his designated representative. Forms for requesting access to medical records are available from the Health and Safety Department or the corporate representative responsible for medical records. A copy of this request will be forwarded to the Health and Safety Department for inclusion in the individual's medical file.

#### 6.0 WRITTEN REPORT

- 6.1 The physician will make a written report to the employer of medical conditions which may make the employee an increased risk to work at a hazardous site and any recommendations on limitations on use of a respirator, personal protective equipment, or any limitation as a result of medical conditions. The physician will not reveal diagnosis or conditions unrelated to employment, but will inform the employee directly of those conditions and any occupationally-related conditions.
- 6.2 The physician should send all original completed forms, lab tests and written reports to the corporate Health and Safety Department, in Richmond, Virginia, or to the division office which will then forward them to the corporate office.
- 6.3 EARTH TECH will provide the employee with a copy of the written opinion from the examining physician.

#### 7.0 EMERGENCY MEDICAL CARE



HEALTH AND SAFETY PROCEDURES			
SUBJECT:		NUMBER: 7	PAGE: 5 OF: 5
	MEDICAL SURVEILLANCE	DATE PUBLISHED:October 2, 1992	
		DATE REVISED:May 3, 1994	

- 7.1 The Site Safety Plan addresses emergency medical care, the treatment of personnel, including possible exposures to toxic substances, and injuries due to accidents or physical problems.
- 7.2 During the preparation of the Site Safety Plan, arrangements should be made with a medical treatment facility or alternate health care service to provide care and adequate treatment to personnel working at job sites. Clear, written directions for locating the facility will be included in the plan. The name, address, and telephone number will be conspicuously posted at the job site. The Site Supervisor is responsible for ensuring that any site employee requesting or requiring medical care due to an injury or illness, or exhibiting erratic or uncharacteristic behavior, will receive emergency medical care. Personnel requiring emergency medical treatment will not be allowed back on site without a written release by a physician.

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HEALTH AND SAFETY PROCEDURES				
SUBJECT:		NUMBER: 8	PAGE: 1 OF: 1	
	AIR MONITORING	DATE PUBLISHED:October 2, 1992		
		DATE REVISED:May 3, 1994		

#### 1.0 POLICY

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Air monitoring will be conducted on all projects involving hazardous materials in order to determine the appropriate level of protection and document potential employee exposure.

#### 2.0 PURPOSE

The purpose of this procedure is to describe air monitoring requirements for hazardous materials projects.

#### 3.0 REQUIREMENTS

- 3.1 Direct reading instruments will be used on sites involving hazardous materials. The instrument to be utilized will be specified in the site-safety plan.
- 3.2 Instruments available include portable gas chromatographs (OVA), photoionization detectors (HNU or TIP). Explosivity meters, hydrogen sulfide monitors, hydrogen cyanide monitors, carbon monoxide monitors, oxygen monitors, and Drager tubes will also be utilized depending on the potential health hazards.
- 3.3 An action level will be established in the Site Safety Plan for each suspected airborne contaminant. A chart discussing the action levels will be included in every Site Safety Plan involving hazardous materials.
- 3.4 Instruments will be calibrated daily.
- 3.5 Records of all direct readings will be kept on the form provided.
- Personal samples will be collected to determine individual exposures per the Site Safety Plan or per guidance by the Health and Safety Manager. Samples will be logged on a sample log and will follow chain-of-custody requirements.
- 3.7 Results will be posted on site.

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Time	Location	Reading (units)	Detection Limits (Scale)
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		Amt, Co.	mponent, Date
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# PERSONAL SAMPLING DATA SHEET

Client:	Material:		
Site Location:	Job No.:	Sampling Media:	

Item No.	Name of EARTH TECH Personnel	SS Number	Sample Number	Date	Start Time	Stop Time	Total Time	Air Fl	ow Vm	Total Air Flow (l)	Sampler's Initials	Amount (mg)	Conc. ppm, mg/m <sup>3</sup>	Remarks
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# HEALTH AND SAFETY PROCEDURES SUBJECT: NUMBER: 9 PAGE: 1 OF: 2 DATE PUBLISHED:April 23, 1991 DATE REVISED:May 17, 1994

#### 1.0 POLICY

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All employee will be thoroughly trained concerning any and all hazards they may face prior to commencement of project work.

#### 2.0 PURPOSE

The purpose of this procedure is to describe training requirements for employees who may be exposed to hazardous substances, health, or safety hazards.

### 3.0 REQUIREMENTS

- Prior to working on a hazardous waste site, employees will receive 40 hours of training. Such training will, as a minimum, include:
  - Hazard Communication (basic toxicology chemical and physical hazard, labeling, and other information systems);
  - Elements of a site safety plan;
  - Respiratory protection;
  - Personal protective equipment;
  - Use of direct reading instruments:
  - Medical surveillance;
  - Decontamination;
  - Site control; and
  - General work practices.
- Employees who can show key work experience or a level of training equivalent to that required in Section 3.1, above, may be certified as to the 40-hour initial training.
- 3.3 An on-site safety training session addressing site specific safety concerns will be conducted by the safety officer prior to work at hazardous waste sites involving potential exposures to hazardous materials. Attendance at this session will be formally recorded using the form provided.
- 3.4 Specific training is required prior to working with certain hazardous materials such as asbestos, lead, or other known carcinogens.



HEALTH AND SAFETY PROCEDURES							
SUBJECT:		NUMBER: 9	PAGE: 2 OF: 2				
	Safety Training Requirements	DATE PUBLISHED: April 23, 1991					
		DATE REVISED:May 17, 1994					

- Operators of equipment such as forklifts of high-pressure washers must be trained prior to using the equipment.
- 3.6 Employees working on a RCRA site will receive 24 hours of initial training.
- 3.7 In addition to the 24- or 40-hour initial training, all employees involved in hazardous waste activities will receive 8 hours annual refresher training.
- 3.8 Daily safety meeting will be conducted per Health and Safety Procedure No. 10.
- 3.9 Contractor employees must provide proof of appropriate training per Health and Safety Procedure No. 32.
- 3.10 Employees assigned to emergency response activities will receive training specific to the equipment and procedures of such activities.

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HEALTH AND SAFETY PROCEDURES						
SUBJECT:		NUMBER: 10	PAGE: 1 OF: 1			
	DAILY SAFETY MEETINGS	DATE PUBLISHED:April 23, 1991				
		DATE REVISED:May 3, 1994				

#### 1.0 POLICY

Daily safety meetings will be held at all job sites.

#### 2.0 PURPOSE

The purpose of this procedure is to describe the requirements for daily safety meetings.

### 3.0 REQUIREMENTS

- 3.1 Meetings are to be conducted by the supervisor, site safety officer, or any other qualified person.
- 3.2 The meetings are to be documented on the tailgate safety meeting form (see next page) and kept at the job site. Upon completion of the project, a copy of each meeting form is to be kept in the project file.
- 3.3 Possible topics include, but are not limited to:
  - Site hazards;
  - Personal protective equipment;
  - Change in level of protection;
  - & Emergency response;
  - & Decontamination;
  - Specific sections of the site health and safety plan;
  - 6 Chemical hazards;
  - Monitoring instruments and results of air monitoring; and
  - Site specific equipment safety.

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1	Project Name: <u>TEFFERSON PRO</u> Project No.: <u>41637</u> Safety Training Log	POCESING .
	Date: <u>8/1/00</u> Time: <u>0809</u>	Page 1 of 2
Briefing Conducted By: ROWALD A . PARTICLA.	Signature:	Company Name:  EXICIH TECH
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New Work Procedures	Slips Trips and Falls	Elevated Work Surfaces
Personal Hygiene	Heat/Cold Stress	Construction Safety
HAZCOM Issues	Confined Space Entry	Hearing Conservation
Exposure Guidelines	Severe Weather	Other:
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This sign-in log documents the safety training conducted in accordance with various Parts of 29 CFR 1910 and 29 CFR 1926 as well as other applicable regulatory requirements. Earth Tech personnel who perform work activities in field/facility environments are required to attend each safety training session and acknowledge receipt of such training at least weekly or prior to a change in site/facility-specific operations or conditions. Additional training topics and/or regulations can be added to address ongoing site/facility operations. The assigned Manager (i.e., project, construction, response, facility, etc.) is instructed to maintain the completed documents at the facility for review for the duration of the project.					
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HAZCOM Issues	☐ Confined Space Entry	☐ Hearing Conservation			
Exposure Guidelines	☐ Severe Weather	Other:			
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John Hudnall	John Judovals	Earth Teah			
Michael Brooks	Nietrad Brooks	Earth TECH			
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☐ HAZCOM Issues	☐ Confined Space Entry	Hearing Conservation	
Exposure Guidelines	☐ Severe Weather	Other:	
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	Project Name:Project No.:	
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		Personnel Information	
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	Project Name: Project No.: Safety Training Log Date: Time:	
	Personnel Information (continued)	. <del> </del>
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TOPICS COVERED:		
General PPE Usage	☐ Site/Facility-specific Guidelines	Emergency Procedures
New Work Procedures	Slips Trips and Falls	☐ Elevated Work Surfaces
Personal Hygiene	Head/Cold Stress	☐ Construction Safety
☐ HAZCOM Issues	☐ Confined Space Entry	☐ Hearing Conservation
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	Personnel Information	
Printed Name	Signature	Company Name
John Hudnall	John Leobrald	earth tech
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	Personnel Information (continued)	
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New Work Procedures	Slips Trips and Falls	Elevated Work	Surfaces
Personal Hygiene	Heat/Cold Stress	☐ Construction S	Safety
☐ HAZCOM Issues	☐ Confined Space Entry	☐ Hearing Conse	ervation
☐ Exposure Guidelines	□ Severe Weather	Other:	
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New Work Procedures	Slips Trips and Falls	Elevated Work Surfaces
Persona Hygiene	Heat/Cold Stress	☐ Construction Safety
☐ HAZCOM Issues	☐ Confined Space Entry	☐ Hearing Conservation
☐ Exposure Guidelines	☐ Severe Weather	Other:
	Personnel Information	
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New Work Procedures	Slips Trips and Falls	Elevated Work Surfaces
Personal Hygiene	☐ Heat/Cold Stress	Construction Safety
☐ HAZCOM Issues	☐ Confined Space Entry	Hearing Conservation
Exposure Guidelines	☐ Severe Weather	Other:
	Personnel Information	
Printed Name	Signature	Company Name
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# Jefferson Processing Site Safety Training Log .. 9/21/00 Time: 07 00

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☐ HAZCOM Issues		Confined Space Entry		Hearing Conservation
☐ Exposure Guidelines		Severe Weather	ß	Other: ELECTRICA SAFET
		Personnel Information		
Printed Name		Signature		Company Name
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	Jefferson Processing Site Safety Training Log	
	Date: 9/22/00 Time: 0700	Page 1 of 2
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MICHAEL S SHERROW	Michael Herror	EARTH TECH
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General PPE Usage	☐ Site/Facility-specific Guidelines	☐ Emergency Procedures
New Work Procedures	☐ Slips Trips and Falls	Elevated Work Surfaces
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Exposure Guidelines	☐ Severe Weather	D Other: PPE UP/DOWN GRADE
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	Personnel Information	
Printed Name	Personnel Information Signature	Company Name
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Bill Robinson Jin Robinson Jack Cain	Signature	ETRS ETRS
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	Personal Hygiene	☐ Heat/Cold Stress	☐ Construction Safety
	HAZCOM Issues	☐ Confined Space Entry	☐ Hearing Conservation
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	John Tuttle	as John Truttla	ET
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	Jefferson Processing Site	
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Briefing Conducted By:	Signature; 100/	Company Name:
MICHAEL D. SHERRON	Michael Denon	EARTH TECH
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	Personal Hygiene		Heat/Cold Stress		Construction Safety
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	Exposure Guidelines		Severe Weather	,zà	Other: Hot WORK
			Personnel Information		
	Printed Name		Signature	<u></u>	Company Name
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## Jefferson Processing Site Safety/Training Log Jefferson Processing Site

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	ng Conducted By:  ICHAEL D SHERZON	Signa	ture: Victael Deno		ny Name: ARTH TECM
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# HEALTH AND SAFETY PROCEDURES SUBJECT: Recordkeeping NUMBER: 11 PAGE: 1 OF: 2 DATE PUBLISHED:April 23, 1991 DATE REVISED:May 17, 1994

#### 1.0 POLICY

Records pertaining to health and safety are to be maintained by either the division office or at the corporate office.

#### 2.0 PURPOSE

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This procedure describes the minimum requirements for maintaining the required health and safety records.

# 3.0 REQUIREMENTS

- 3.1 The OSHA 200 log will be maintained by Corporate Health and Safety. A copy will be readily available at the Corporate home office.
- 3.2 Medical records will be kept by each division office and will include:
  - Name and social security number of employee;
  - Date of medical exam;
  - Any employee medical complaints related to exposure;
  - Physicians written opinions regarding the employee;
  - A copy of any information provided to the physician by the employer; and
  - Accident/Injury reports.
- 3.3 Training records will be kept at each division office in each person's personnel file and include:
  - 40-hour initial training certification;
  - Asbestos certification;
  - First Aid/CPR;
  - Forklift training;
  - Respirator fit testing; and
  - Refresher 8-hour training.
- 3.4 Air sampling data and permits (hot work, confined space, line entry) will be kept in the project files



HEALTH A	ND SAFETY PROCEDURA	ES	
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- 3.5 The project manager and site safety officer will review the records of each person prior to assignment of work involving hazardous materials and assure that the medical surveillance, training, and respirator fit tests are current.
- 3.6 All medical records are to be retained for the duration of employment and 30 years thereafter.
- 3.7 Should a division office close, the required records will be transferred to the corporate office.

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HEALTH AND SAFETY PROCEDURES				
SUBJECT:	NUMBER: 12	PAGE: 1 OF: 4		
PERSONAL PROTECTIVE EQUIPMENT (PPE)	DATE PUBLISHED:October 2, 1992			
	DATE REVISED:May 3, 1994			

#### 1.0 POLICY

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All employees who may be exposed to hazardous substances will be provided with the necessary personal protective equipment.

#### 2.0 PURPOSE

The purpose of this procedure is to describe the requirements for the selection and use of personal protective equipment (PPE).

#### 3.0 GENERAL INFORMATION

- 3.1 The wearing of company-approved hard hats on job sites is mandatory. Hard hats will meet the specifications of ANSI 289.1 as required by OSHA.
- 3.2 Eye protection will be worn when machine or operations present potential eye injury from physical, chemical, or radiation agents. Eye and face protection required herein will meet the requirements specified in ANSI 287.1.
- Face shields are to be worn when full-face protection is required from exposures similar to those listed under eye protection. Face shields are not substitutes for eye protection.
- Ear plugs or muffs are to be used when exposed to injurious noise levels over extended periods of time. For specific requirements, see OSHA 1926.52.
- 3.5 Gloves are to be used when hands are exposed to sustained heat and sparks, wet concrete, acids, corrosives, electrical exposure, etc.
- 3.6 Chemical resistant, steel toe and shank boots are to be worn when working on all job sites.
- 3.7 Safety full-body harnesses meeting the Federal OSHA standards will be worn by all employees exposed to falls from unprotected heights of 6 feet or more. Safety harness lanyards will be a minimum of 0.5-inch nylon or equivalent with a maximum length to provide for a fall no greater than 6 feet.
- 3.8 Life jackets and ring buoys are to be used where employees are working over or near water.
- 3.9 Flagmen vests are to be worn by employees flagging traffic or workers exposed to traffic.
- 3.10 Reflective belts are to be worn by all employees on foot around equipment at night.
- 3. 1 Seat belts are to be installed and used in the front seats of passenger cars, pickups, and trucks. (Driver's seat only in hauling units where no riders are allowed. Use "NO RIDERS" decal.)
- 3.12 Appropriate work clothing will be worn at all times to minimize the hazards from work:



HEALTH AND SAFETY PROCEDURES				
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PERSONAL PROTECTIVE EQUIPMENT (PPE)	DATE PUBLISHED:October 2, 1992			
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- Shirts which cover the shoulders and torso (tee shirts are not acceptable). Shirts or alternate protection which cover the entire arm may be required in certain circumstances.
- Shorts are prohibited.
- Loose clothing or jewelry which may catch or become entangled with equipment is prohibited.

#### 4.0 LEVELS OF PROTECTION

4.1 The level of protection will be specified in all project health and safety plans. Personal protective equipment has been divided into four categories based on the degree of protection afforded.

# 4.2 Level A

Level A protection must be used when the highest level of skin, eye, and respiratory is required based on measured levels or potential for high concentrations of atmospheres vapors, gases or particulates, or when a high potential for skin contact with harmful materials exists. Level A equipment includes:

- Pressure demand (positive pressure) full-face self-contained breathing apparatus (SCBA) or airline respirator with escape SCBA;
- Totally encapsulating chemical-protective suit;
- Hard hat;
- Gloves outer and inner, chemical resistant;
- Boots chemical resistant, steel toe, and shank; and
- Two-way radio (worn inside suit).

# 4.3 Level B

Level B protection must be used when the highest level of respiratory protection is required (as in Level A), but a lesser degree of skin protection is required. Level B equipment incudes:

Pressure - demand (positive pressure) full-face SCBA or airline respirator with escape SCBA;



# HEALTH AND SAFETY PROCEDURES SUBJECT: PERSONAL PROTECTIVE EQUIPMENT (PPE) DATE PUBLISHED:October 2, 1992 DATE REVISED:May 3, 1994

- Hooded, chemical resistant clothing, such as one or two piece splash suit or disposable chemical resistant coveralls;
- Gloves outer and inner, chemical resistant;
- Boots chemical resistant, steel toe, and shank;
- A Hard hat; and
- Two-way radio.

### 4.4 Level C

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Level C protection must be worn when the airborne contaminants are known and the criteria for using air purifying respiratory is met. Level C equipment includes:

- Full-face or half-mask air purifying respirators with cartridges approved for the type of exposures likely to be encountered;
- Hooded, chemical resistant clothing such as overalls, and long-sleeved jacket, one or two piece splash suit or disposable, chemical resistant coveralls;
- Gloves outer and inner, chemical resistant;
- Boots chemical resistant, steel toe, and shank;
- Hard hat; and
- Two-way radio.

#### 4.5 Level D

Level D is the basic work uniform that will be used. It provides only minimal protection. Level D equipment, used as appropriate, includes:

- 62 Coveralls;
- Boots chemical resistant, steel toe, and shank;
- € Gloves;
- Safety glasses; and
- Hard hat.



HEALTH AND SAFETY PROCEDURES				
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- 4.6 The specific equipment requirements within a given level of protection may be modified as necessary to suit the particular needs of a project. However, the requirements for Level A to D, as specified in Sections 4.2 through 4.5, above, will be retained as minimum requirements.
- 4.7 The level of protection may be upgraded or downgraded by the site safety officer as conditions change at the site.

# Reasons to upgrade include:

- Change in work task that will increase contact or potential contact with hazardous materials;
- Action level is detected during monitoring; and/or
- Request of the individual employee.

### Reasons to downgrade include:

- New information indicates the situation is less hazardous than originally believed;
- Change in site conditions that decreases the hazards;
- Change in work task that will reduce contact with hazardous materials; and/or
- Monitoring or lab analysis support a decision to downgrade.

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RESPIRATORY PROTECTION - EXCEPT SCBA	DATE PUBLISHED:October 2, 1992			
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#### 1.0 POLICY

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No individual will enter an area where respiratory protective equipment is required unless the person has been trained in the selection, use, care and limitations of the respirator, and the proper respirator has been selected for the task.

#### 2.0 PURPOSE

This procedures provides managers and employees with requirements in the selection, use, care, and limitations of respiratory protective equipment.

#### 3.0 SCOPE

This procedure applies to all types of respiratory protective equipment except SCBA.

# 4.0 GENERAL REQUIREMENTS

- 4.1 Whenever respirators are required, only equipment approved for that purpose will be used. This equipment must be approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH). Only parts approved for the specific respirator system are to be used for replacement. Modifications to respirators are not allowed unless authorized by the approved agency. Only a person specifically trained should perform work on respirators.
- 4.2 Proper selection of respirators is to be made according to guidance provided by ANSI standard Z88.2-1980. The correct respirator is to be specified for each job. Site health and safety plans, as part of the level of protection requirements, will specify the type of respirator to be used.

The hazardous site is also constantly monitored to detect any changes in the working conditions. This procedure allows site safety officers to choose the correct type of respirator in any given situation. EARTH TECH site safety officers periodically monitor the level of contamination in the work area. They determine the amount of exposure the employees face and the acceptable level for each employee. Direct reading instruments are used to make sure the proper respirator is selected.

4.3 Any employee issued a respirator will be provided training in the selection, use, care, and limitations of the respirator, including the provisions of this procedure. Additionally, anyone using a negative pressure respirator will receive a fit test at least annually. The fit test will be qualitative, although for certain projects, a quantitative fit test will be required as designated by the site safety plan.

After the respirator fitting test has been completed, employees will be issued and must keep a record of the test results. The following information must be recorded: the type of test administered, type of respirator used, name of employee tested, name of employee giving the test, date, and test results.

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- 4.4 Respirators are to be inspected by the user before each use and not worn if defective or if conditions prevent a gas tight face to facepiece seal. Each part of the respirator must be examined. Check for cuts, holes, stiffening, or crushing of the facepiece. The headbands must not have any breaks, tears, bent or missing hardware, or loss of elasticity. The inhalation and exhalation valve system must be checked for dust or dirt on valve flap. No tears or cracks may exist in the valve itself.
- 4.5 Employees may not wear facial hair that interferes with a good gas-tight face seal. Other conditions which could interfere with a good face seal include wearing of glasses under full-face respirators, absent teeth or dentures, or unusual face configurations.
- 4.6 Contact lenses are not to be worn in an atmosphere requiring a respirator. Eyeglass kits for prescription lenses in a full-face respirator will be provided by EARTH TECH.
- 4.7 All breathing air used for supplied air respirators must be grade D or better as described by the Compressed Gas Association Specification G-7.1-1973. The breathing air supply must be equipped with necessary safety items including alarms to indicate low air pressure. If an oil lubricated compressor is used, an additional alarm to indicate over temperature or carbon monoxide buildup must be used. Air line couplings associated with breathing air must be incompatible with outlets for other gas systems.
- 4.8 Persons will not be assigned tasks requiring the use of respirators unless it has been determined that they are physically able to perform the work while using the respiratory equipment. A physician with sufficient knowledge of respiratory protection will determine what health and physical conditions are pertinent. The medical status of persons assigned to use respirators will be reviewed annually.
- 4.9 Respiratory equipment will be cleaned, inspected, and sanitized after each use by the user or site person assigned to decontamination. When not in use, respirators are to be stored to protect against dust, sunlight, extreme temperatures, excessive moisture, or damaging chemicals.
- 4.10 Cleaning will be accomplished in four steps:

#### 4.10.1 Washing

The respirator should be washed in warm water about 140°F with a good detergent using a soft brush. Insert all valves and headband.

# HEALTH AND SAFETY PROCEDURES SUBJECT: RESPIRATORY PROTECTION - EXCEPT SCBA DATE PUBLISHED:October 2, 1992 DATE REVISED:May 3, 1994

### 4.10.2 **Rinsing**

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# 4.10.3 Disinfecting

Disinfecting rinse consisting of two tablespoons chlorine bleach added to a gallon of water.

### 4.10.4 Rinsing

After disinfecting, the respirator will be rinsed in clean, warm water. All traces of detergent and disinfectant must be removed.

# 4.10.5 **Drying**

Allow respirator to air dry by hanging or placing on a clean surface. If it is not possible to air dry, then towel dry before bagging. When dry, assemble the respirator, and store in a clean poly bag.

4.11 An evaluation of the respiratory protection program's effectiveness should take place at least once a year. Improvements and modifications needed to correct any program deficiencies or meet additional needs should be accomplished. The program evaluation considers wearer acceptance of the respirator, additional inspection of the program in action, and appraisal of the protection provided to employees.

#### 5.0 SPECIFIC RESPIRATORS

# 5.1 Air purifying - General Information

Air purifying respirators provide clean air to the wearer by passing atmospheric air through a filtering element. Because most air purifying respirators are also negative pressure (the driving force for air movement is the users inhalation, creating a negative pressure inside the mask), any leakage around the sealing surface of the respirator will be directed inward. These air purifying respirators offer a lower level of protection than air supplied respirators. Air purifying respirators are never to be worn in oxygen deficient atmospheres (less than 20.8 percent oxygen). Air purifying respirators are not to be worn when the airborne contaminant does not possess adequate warning properties (i.e., odor) to warn the user of cartridge breakthrough. Air purifying respirators may be either a half-facepiece of full-facepiece style.

#### 5.2 Air Purifying — Cartridge Type

A variety of cartridges exist for air purifying respirators. The specific one used depends on the type of contaminant being protected against. The site health and safety plan will specify which cartridge is to be used. Common cartridges available include organic vapors, acid gases, ammonia, and various combinations of the above. Furthermore, particulates can



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be filtered as well, often in combination with gas and vapor protection. Some materials require use of a High Efficiency Particulate Aerosol (HEPA) filter.

# 5.3 <u>Disposable Air Purifying Respirators</u>

Disposable (paper) respirators do not protect against gases or vapors. Due to the uncertainty involved in fitting a paper mask, these respirators are not to be used except for nuisance-type dusts.

# 5.4 <u>Air Supplied Respirators -- SCBA</u>

A SCBA provides the highest level of protection of any respirator. SCBAs are addressed in greater detail in a separate Health and Safety Procedure.

# 5.5 <u>Air Supplied Respirators -- Airline Respirators with Escape Pack</u>

In some cases, an airline respirator with an emergency escape pack may be used instead of an SCBA. This unit consists of a pressure demand airline respirator connected to a source of breathing air combined with a 5-minute air bottle unit to allow escape if the source of breathing air fails.

5.6 Airline respirators in the continuous flow mode are not approved for Immediately Dangerous to Life and Health (IDLH) or oxygen deficient atmospheres. However, they do provide a higher level of protection than air purifying respirators because facepiece leakage tends to be outward. Prior to use, alarms and any air filters must be checked. Supplied air must be grade D or better. Hose length must be limited to 250 feet for Survivair, but it is recommended that 50 feet be the maximum hose length. The airline hose may constitute a safety problem if activities such as ladder climbing are required.

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# FIT TEST RECORD

GENERAL INFORMATION			
Emp-oyee Name:	Г	ate of Fit Test:	
Employee Number	F	mployee Section Number:	
Person Performing Fit Test:	s	ignature (person performing fit te	st):
RESPIRATOR SELECTION			
Respirator Manufacturer:	F	Respirator Model/Size:	
Respirator Type:			
☐ Full-face, dual cartridge ☐ H	alf-face, dual cartridge	□ Other:	
D			
FIT TEST RESULTS		·	
Positive/Negative Pressure Check	: □ Yes □	□ No	
Fit Test Method:			
☐ Irritant Smoke ☐ Iso	oamyl Acetate	Saccharin	Other:
Fit Test Results:			
□ Pa	ass 🗆	Fail	
COMMENTS			

# Rainbow Passage (per 29 CFR 1910.134)

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but not one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.



# HEALTH AND SAFETY PROCEDURES SUBJECT: SELF-CONTAINED BREATHING APPARATUS (SCBA) DATE PUBLISHED:October 2, 1992 DATE REVISED:May 3, 1994

#### 1.0 POLICY

A Self-Contained Breathing Apparatus (SCBA) is approved for IDLH or oxygen deficient (less than 20 8 percent) situations.

#### 2.0 PURPOSE

This procedure provides project managers and employees with the requirements in the use, care, and limitations of SCBAs.

#### 3.0 SCOPE

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This procedure applies only to use of SCBAs.

#### 4.0 PROCEDURE

- 4.1 SCBAs are to be used whenever level A or B protection is required, whenever the site health and safety officer requires their use, or whenever the hazards of a situation cannot be assessed prior to entry.
  - 4.1.1 Exceptions based upon site conditions may be granted where an airline respirator with escape pack system has been approved by the site safety officer.
- 4.2 Only SCBAs operating in the positive pressure (pressure demand) mode will be used.
- 4.3 No individual will use an SCBA until training on the use, care and limitations of the SCBA has been received. Such training will be received at least annually.
- 4.4 SCBAs are to be inspected by the user prior to use to ensure the cylinder is fully charged, the regulator and warning devices operate properly, and that the harness, facepiece, hoses, and head straps are in good condition.
- 4.5 SCBAs are not to be used if the tank is not fully charged or if any other condition exists which could cause failure of the unit during use.
- 4.6 When using an SCBA, users will leave the work area promptly when the low air pressure alarm signal sounds.
- 4.7 Individuals are not to make repairs or modifications to an SCBA unless specifically authorized by the manufacturer of the unit and the site safety officer.
- 4.8 The Site Safety Officer is responsible for maintaining the SCBAs ready for use at all times. This includes performing the monthly inspections and inspecting, sanitizing, and refilling or replacing the air tanks after each use.

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- 4.9 Monthly inspections are to include checks on tightness of connections and the condition of the headbands, valves, and connecting tubes. Rubber parts are to be inspected for pliability and deterioration. The air tank must be fully charged and the hydrotest certification must be correct. Regulator and warning devices must function properly. A record of inspection dates is to be maintained on the SCBA or in its storage container and must include the inspector's name, date of inspection, and identification number of the SCBA. The inspection checklists are to be kept with the SCBA for reference. The checklist is shown following this procedure.
- 4.10 Any deficiency noted during inspection requires removing the SCBA from service until the condition is corrected. The SCBA and the storage case must be clearly marked or tagged "OUT OF SERVICE."
- 4.11 SCBAs are not to be worn if conditions prevent a gas tight face to facepiece seal. Employees may not wear facial hair that interferes with a gas tight face seal. Other conditions which could interfere with a face seal include wearing of glasses, absent teeth or dentures, or unusual face configurations.
- 4.12 Contact lenses are not to be worn in an atmosphere requiring an SCBA. Eyeglass kits for prescription lenses are provided by EARTH TECH.
- 4.13 Persons will not be assigned tasks requiring the use of an SCBA unless it has been determined that they are physically able to perform the work while wearing the SCBA. A physician with sufficient knowledge of respiratory protection will determine what health and physical conditions are pertinent. The medical status of persons assigned to use SCBAs will be reviewed annually.

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# HEALTH AND SAFETY PROCEDURES SUBJECT: Number: 15 PAGE: 1 OF: 1 DATE PUBLISHED:April 23, 1991 DATE REVISED:May 17, 1994

#### 1.0 POLICY

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All job sites involving hazardous materials will be divided into 3 well delineated work zones.

#### 2.0 PURPOSE

The purpose of this procedure is to describe the requirements for establishing work zones on job sites involving hazardous materials.

#### 3.0 EXCLUSION ZONE

- 3.1 This is an area where contamination can or could occur. This zone has the highest inhalation exposure potential and may present a high probability of chemical contact with skin.
- 3.2 Activities in the exclusion zone include site characterization (mapping, sampling), installation of monitoring wells and all cleanup or remediation work.
- 3.3 The outer boundary is based on initial data evaluations and distances required for safety operations.
- 3.4 The outer border should be clearly marked by the use of physical barriers such as fences or barrier tape and proper warning signs and labels.

### 4.0 CONTAMINATION REDUCTION ZONE

- 4.1 This is the area immediately adjacent to exclusion zone and serves as a transition between the contaminated and clean areas.
- 4.2 Activities in the contamination reduction zones include decontamination, equipment resupply (air tanks, protective equipment, sampling equipment, etc.), sample packaging, and worker temporary rest area.
- 4.3 All exits from exclusion zone must proceed through the decontamination area, except in emergencies.

#### 5.0 SUPPORT ZONE

- 5.1 This area should contain no contamination and is located outside of the contamination reduction zone. Exposure to chemicals is unlikely. No protective equipment is required.
- 5.2 The support zone should be located upwind of the exclusion zone.
- 5.3 Activities in this area include the command post, equipment storage, administrative activities, and field laboratory.

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# HEALTH AND SAFETY PROCEDURES SUBJECT: DECONTAMINATION DATE PUBLISHED:October 2, 1992 DATE REVISED:May 3, 1994

#### 1.0 POLICY

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All personnel working on job sites involving hazardous materials require decontamination upon leaving the exclusion zone.

#### 2.0 PURPOSE

The purpose of this procedure is to describe the requirements for decontamination.

# 3.0 REQUIREMENTS

- 3.1 Site-safety plans will include a section on decontamination with specific requirements.
- 3.2 Every exit from the exclusion zone requires decontamination. The exception is an emergency situation. If an employee is injured, decontaminate to the extent possible given the nature of the injury.
- 3.3 Large equipment such as drill rigs will be decontaminated by using a steam or hot water hose wash or by detergent wash.
- 3.4 The procedure will vary from site to site but will always include the following steps:
  - Equipment drop;
  - Outer boots and glove wash/rinse (step off);
  - Outer boots and gloves removal;
  - Suit wash/rinse/removal;
  - Inner glove wash/rinse;
  - Face piece removal, wash/rinse;
  - Inner glove removal; and
  - Field wash (face, hands).
- Personnel assigned to the decontamination process will assist workers and decontaminate equipment and reusable protective gear.
- 3.6 An on-site shower facility will be provided whenever necessary.

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# SUBJECT: NUMBER: 17 PAGE: 1 OF: 3 DATE PUBLISHED:April 23, 1991 DATE REVISED:May 3, 1994

#### 1.0 POLICY

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Project supervision is to be aware of the symptoms and causes of heat-related illnesses and take appropriate steps to prevent their occurrence.

#### 2.0 PURPOSE

This procedure describes the causes, symptoms, treatment, and/or prevention of heat-related illness.

#### 3.0 GENERAL INFORMATION

- 3.1 Heat-related illnesses are generally caused by the body's inability to remove metabolic heat while being exposed to excessive environmental heat.
- 3..2 A period of adjustment or acclimatization is necessary before maximum tolerance to heat is acquired. Most workers require 7 to 10 working days of gradually increasing workload to become fully acclimatized.
- 3.3 The body's core temperature must be maintained below 100 degrees Fahrenheit or else heat stress can occur.
- 3.4 Pulse rate is another good indicator of heat stress. The pulse rate after one minute of recovery should be less than 110 beats per minute.
- 3.5 Heat-related illnesses are caused by the loss of water and electrolytes.

#### 4.0 HEAT-RELATED ILLNESSES

4.1 Heat rash can be caused by continuous exposure to hot and humid air.

<u>Signs and Symptoms</u>: The condition is characterized by a localized red skin rash and reduced sweating. Aside from being a nuisance, the ability to tolerate heat is reduced.

<u>Treatment</u>: Keep skin hygienically clean and allow it to dry thoroughly after using chemical protective clothing.

4.2 Heat cramps are caused by profuse perspiration with inadequate fluid intake and salt replacement.

Signs and symptoms: Muscle spasm and pain in the extremities and abdomen.

<u>Treatment</u>: Remove affected person to a cool place and give sips of salted water (1 teaspoon of salt to 1 quart of water). The salted water should quickly mitigate the cramps. Manual pressure may also be applied to the cramped muscles.



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4.3 Heat exhaustion is a mild form of shock caused by sustained physical activity in heat and profuse perspiration without adequate fluid and salt replacement.

<u>Signs and Symptoms</u>: Weak pulse; shallow breathing: pale, cool, moist (clammy) skin; profuse sweating; dizziness; fatigue.

<u>Treatment</u>: Remove affected person to a cool place and remove as much clothing as possible. Give sips of salted water and fan the person continually to remove heat by convection. <u>CAUTION</u>: Do not allow the affected person to become chilled -- treat for shock if necessary.

4.4 Heatstroke is the most severe form of heat stress; the body must be cooled immediately to prevent severe injury and/or death.

Signs and Symptoms: Red, hot, dry, skin; body temperature of 105 degrees Fahrenheit or higher; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.

<u>Treatment</u>: Heat stroke is a true medical emergency. Transportation of the victim to a medical facility must not be delayed. Prior to transport, remove as much clothing as possible and wrap the victim in a sheet soaked with water. Fan vigorously while transporting to help reduce body temperature. Apply cold packs, if available; place under the arms, around the neck, or any other place where they can cool large surface blood vessels. If convulsions develop, prevent victim from biting his tongue. If transportation to a medical facility is delayed, reduce body temperature by immersing victim in an ice/water bath (however, be careful not to over chill the victim once body temperature is reduced below 102 degrees Fahrenheit). If this is not possible, keep victim wrapped in a sheet and continuously douse with water and fan.

# 5.0 SPECIFIC REQUIREMENTS

- 5.1 A section of site-safety plans will address heat stress if the ambient temperature is expected to exceed 70 degrees Fahrenheit.
- 5.2 The site-safety plan will discuss work-rest cycles and provisions for monitoring the level of heat stress (i.e., pulse rate).
- Workers are to be advised not to drink caffeinated or alcoholic beverages because they increase the rate of body water loss.
- 5.4 Increase dietary salt or lightly salted (0.2 percent) water is adequate to replace lost salt. Salt tablets are not to be used.
- 5.5 If juice or electrolyte drinks are used, they should be diluted prior to drinking.
- 5.6 Thirst is not an adequate indicator of body water loss. Workers are to drink at least small amounts of water on each break.



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Workers are to rest when any of the symptoms described above are present. The buddy system is mandatory, as most often the potential victim will not be aware of any symptoms. Watch out for each other.

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# HEALTH AND SAFETY PROCEDURES SUBJECT: NUMBER: 18 PAGE: 1 OF: 3 DATE PUBLISHED:April 23, 1991 DATE REVISED:May 3, 1994

#### 1.0 POLICY

No employee is to enter a confined space until atmospheric testing has been conducted and a confined space entry permit has been completed. Confined space permits are valid for a single work shift only, unless conditions do not change on a daily basis. Employees will be trained per the requirements of the OSHA Confined Space Standard 29 CFR 1910.146 prior to entry.

# 2.0 PURPOSE

This procedure provides personnel with requirements for working safely in confined spaces.

#### 3.0 **DEFINITIONS**

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- 3. <u>Confined Space</u> Any enclosed area having a limited means of egress where ventilation is not adequate to remove a toxic or flammable atmosphere or oxygen deficiency which may exist. Examples of confined spaces include, but are not limited to: tanks, vessels, bins, boilers, ducts, skewers, underground utility vaults, manholes, tunnels, pipelines, or any open top space more than 4 feet in depth such as pits, tubes, vaults, or vessels.
- 3.2 Oxygen Deficiency Atmospheres which contain less than 19.5 percent oxygen.
- 3.3 <u>Flammable Atmosphere</u> Atmospheres in excess of 10 percent of the lower flammable limit of the material in question. These are often toxic as well as flammable.
- 3.4 <u>Toxic Atmosphere</u> Atmospheres having concentrations of airborne chemicals in excess of permissible exposure limits as defined by Federal or state regulations or Threshold Limit Values (TLVs).
- 3.5 <u>IDLH</u> Immediately Dangerous to Life or Health conditions (e.g., oxygen deficiency, unknowns, elevated toxics, etc.)

#### 4.0 PROCEDURE

- 4.1 A confined space entry permit containing the applicable elements of this section will be written and approved prior to any entry into a confined space.
- 4.2 The confined space is to be emptied, flushed, or otherwise purged of hazardous substances.
- 4.3 Pipes or lines which convey any kind of substance to the confined space are to be disconnected, blinded, or have the valve locked off to prevent such substances from entering the confined space while work is in progress.
- 4.4 Electrical circuits to fixed mechanical equipment which may cause injury if accidentally energized must be de-energized and locked out.



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- 4.5 The air in the confined space is to be tested for oxygen deficiency, flammable atmosphere, and any toxic contaminants likely to be present. All tests of the atmosphere are to be made by trained, competent personnel using calibrated equipment.
- 4.6 Electrical equipment and lighting are to be explosion proof when used in confined spaces subject to flammable or explosive gases, vapors, or dusts. Extreme care must be taken in dusty atmospheres because there may be no indication of problems on atmospheric test equipment, yet hazards may exist. Power tools should be pneumatic when possible.
- 4.7 All work will stop and the confined space evacuated if any indication of ill effect such as dizziness, irritation, or excessive odors are noted.
- 4.8 Welding and/or cutting in a confined space shall require the use of a hot-work permit. Cutting gas cylinders and welding machines will not be taken into confined spaces.
- 4.9 All employees entering a confined space shall wear and/or have available an approved safety harness and/or rope. When the confined space is entered through a manhole or is deeper than the employee's shoulders, an approved life line should be attached. When the nature of the space entered involves more than one employee and the fouling of life lines could occur, the Safety Department should be consulted.
- 4.10 Rescue equipment must be at the project site prior to commencing work. Rescue equipment will include extra rope, safety harnesses, stretchers, and emergency SCBA and/or source of oxygen. No one should enter a confined space until adequate safety equipment is present to remove an unconscious person.
- 4.11 A ladder is required in all confined spaces deeper than the employees' shoulders. The ladder shall be secured and not removed until all employees have exited the space.
- 4.12 The project supervisor is responsible for evaluating general safety hazards including permits, locking out of equipment, adequate lighting, tools, etc., and is responsible for assuring the confined space entry permit is completed.
- 4.13 Confined space entry permits will be maintained in the project file.
- 4.14 A copy of the confined space entry permit follows this procedure.

# 5.0 CONFINED SPACE ENTRY PROCEDURES FOR SAFETY OBSERVER

Employees entering a confined space must be under the constant surveillance of a safety observer. It is the safety observer's responsibility to follow this procedure:

- A valid confined space entry permit must be at the site.
- Rescue equipment must be available at the site.



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- The safety observer must know the location of the nearest telephone and emergency numbers, safety shower, and fire extinguishers.
- When welding or cutting is done in a confined space, the safety observer must know how to shut down the equipment.
- The safety observer must remain in constant contact with the employees in the confined space. The observer is not to leave his/her assigned station space except to report an emergency.

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# EARTH TECH CONFINED SPACE ENTRY PERMIT

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Good on this date only:	From: _		AM/PM	To:	AM/Pì
Location:		Project No.:			<del></del>
Workers Authorized Entry:	Work Monitors:		_	Work Monitors:	
Description of job or special procedures:					
Employee Training and Pre-Entry Briefing					
Safe Entry and Rescue Training conducted on:			(Date)		
Mandatory Pre-Entry Briefing conducted on:			<i>'</i>		
3. Does this job require special training?  Contractor Notification		Yes		_ No	
Contractor notified of: Permit Conditions		Potential Hazards		N/A	
	Special Tools/Equip			Communication Devices	
			_		
Are all electrical devices intrinsically safe?     Have all power cords and tools been visually insp	ected?	Yes Yes		 _ No _ No	
Vessel Preparation 1. Work area isolated with signs/barriers? 2. All energy sources locked/tagged out? 3. All input lines capped/blinded? 4. Vessel contents drained/flushed/neutralized? 5. Vessel cleaned/purged? 6. Ventilation provided 30 minutes before entry?		YesYesYesYesYesYes		_ No _ No _ No _ No _ No _ No	
Pre-Entry Atmospheric Testing	Reading:			Time:	Initials:
Test for oxygen content:     Test for flammable concentration:     Test for toxic concentration:	% O <sub>2</sub>			Time.	
Emergency/Rescue Procedures  1. Location of written emergency/rescue plan:					
2. Type of emergency/rescue team required: On-si					
Safety Equipment Personal Protective Equipment Required:		Area Saf	ety Equipn	nent Required:	
Self-Contained Breathing Apparatus required?     Portable Atmospheric Monitor required?		Yes		Type:	
Permit Authorization I certify that I have inspected the work area for safety Permit authorized by (Signature):			corded on		

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#### 1.0 POLICY

No employee is to break into a line until a line entry permit has been completed. The line entry permit is valid for a single work shift only.

### 2.0 PURPOSE

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This procedure provides requirements for breaking into lines which contain or may contain hazardous materials.

#### 3.0 PROCEDURE – PRE-ENTRY

- 3.1 Prior to beginning operations at a site, the potential hazards associated with line entry will be recognized and addressed.
- 3.2 Each line should be regarded as potentially full and pressurized with a toxic, flammable product until it is proven otherwise. Safe line entry requires investigation and pre-planning before work begins.
- 3.3 It is critical to determine the line contents to assess the product's toxic and flammable properties.
  - Trace line to each end. For example, identify the pipe run between tanks or reactors.
  - Check for color coding. Many plants designate line contents by their own color-coding system. Do not assume one plant's code is the same as another or consistent within each plant.
  - If necessary, sample line contents.
- 3.4 Scaffolding or mainlifts used for elevated piping must be used according to manufacturer's specifications. Guardrails and tieoffs must be used.
- 3.5 Portable lighting must be provided if area is not sufficiently illuminated.
- 3.6 Any electrical lines near the work area must be de-energized prior to beginning operations. All electrical circuits are to be locked out.
- 3.7 Establish the level of protection (personal protective equipment) needed for the job, as well as any decontamination, secondary containment or spill response procedures.

#### 4.0 PROCEDURE – LINE BREAKING

4. Isolate the line by closing, locking, and tagging all valves entering the line.



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- 4.2 Lock and tag all electrical systems for pumps and automatic valves contained in the pipe run to be entered.
- 4.3 Remove all free product by pumping or draining. Inert or purge if applicable.
- 4.4 Blank or disconnect Line -- Install some physical barrier to prevent additional product from entering the system.
  - 4.4.1 Insert a blank or blind in a line to block it completely. This is important since valves should not be considered trustworthy. Valves have been known to leak even when fully closed.
  - 4.4.2 Make use of double block and bleed (two closed valves within close proximity of each other with an open drain line between), if available.
- 4.5 Prepare for Line Entry
  - 4.5.1 Establish exclusion zone. Zone should be sufficiently large to prevent unprepared people from contacting line material from liquid splash or vapor/gas emission.
  - 4.5.2 Stage appropriate spill-control media at site.
  - 4.5.3 Establish fire watch if necessary.
  - 4.5.4 Review level of personal protective equipment (e.g., respirator, clothing, gloves, and eye protection).
  - 4.5.5 Conduct air monitoring, including perimeter monitoring, for possible releases and explosive atmosphere survey or work area.
  - 4.5.6 Stage appropriate working surface (e.g., ladder, scaffold, mainlift, etc.)

#### 4.6 Enter the Line

- 4.6.1 Best place to enter a line is at a flange.
- 4.6.2 Use nonsparking tools, such as brass, to loosen flange bolts if dealing with a flammable material.
- 4.6.3 Slowly loosen top flange bolts first. This will relieve pressure if any. If the line still contains fluid, the material will be noted as dripping or welling around the flange. If these conditions are noted, retighten and recheck purge procedures.
- 4.6.4 Because of possible leaks, no one will stand adjacent to or under a flange when opening.



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- 4.7 The project supervisor is responsible for evaluating all safety hazards and assuring that the line entry permit is properly completed.
- 4.8 Line entry permits will be maintained in the project file.
- 4.9 A copy of the line entry permit follows this procedure.

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# LINE BREAKING PERMIT

(Good for One Work Shift Only)

ين.	Date	Time To		AM/PM_
_	Location			
_	Line of Equipment			
-	Potential Chemical Hazards			
1	B) Safety Precautions			
1)	All emergency equipment	in position?	Yes	No
2)	Lines drained, purged and	or washed clean of material?	Yes	Not Necessary
3)	All valves checked for pos	itioning and tagged?	Yes	Not Necessary
4)	All electrical equipment lo	cked out and tagged?	Yes	Not Necessary
5)	Fire watch designated?		Yes	Not Necessary
6)	Exclusion zone roped off	and signs posted?	Yes	Not Necessary
7)	Personnel wearing adequa hazard (consult site safety	te personal protective equipment for expected plan)?	l Yes	Not Necessary
8)	LEL survey completed?		Yes	Not Necessary
9)	Air monitoring equipment	for poisonous/toxic substance available?	Yes	Not Necessary
10)	Decontamination, spill res in place, and ready for res	ponse equipment and procedures established, ponse?	Yes	Not Necessary
11)	All personnel briefed on p	rocedures?	Yes	Not Necessary
I	Supervisor Foreman Site Safety Officer Line Breaking Crew	ecautions have been taken in accordance with	the line brea	aking procedures.

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# LINF BREAKING PERMIT

(Good for One Work Shift Only)

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A)					
Date	e Time A	M/PM	То	AM/	′PN
Loc	ation				
Line	e of Equipment				
Pote	ntial Chemical Hazards				
<b>B</b> )	Se fety Precautions				
1)	All emergency equipment in position?		Yes	No	
2)	Lines drained, purged and/or washed clean of material?	· <del>-</del>	Yes	Not Necessary	
3)	All valves checked for positioning and tagged?		Yes	Not Necessary	
4)	All electrical equipment locked out and tagged?		Yes	Not Necessary	
5)	Fire watch designated?		Yes	Not Necessary	
6)	Exclusion zone roped off and signs posted?		Yes	Not Necessary	
7)	Personnel wearing adequate personal protective equipment for expected hazard (consult site safety plan)?	or	Yes	Not Necessary	
8)	LEL survey completed?		Yes	Not Necessary	
9)	Air monitoring equipment for poisonous/toxic substance avai	ilable?	Yes	Not Necessary	
10)	Decontamination, spill response equipment and procedures established, in place, and ready for response?		Yes	Not Necessary	
11)	All personnel briefed on procedures?		Yes	Not Necessary	
I certif	y that all necessary precautions have been taken in accordance	with th	e line breal	king procedures.	
	Supervisor		<del>_</del>		
	Foreman		<del>_</del>		
Site	Safety Officer				

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Line Breaking

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HEALTH A	ND SAFETY PROCEDURES		
SUBJECT:		NUMBER: 20	PAGE: 1 OF: 4
	HOT WORK	DATE PUBLISHED	:April 23, 1991
		DATE REVISED:M	ay 5, 1994

#### 1.0 POLICY

No work involving a flame- or spark-producing operations is to be conducted without preparing a hot work permit and following the provisions of this procedure.

#### 2.0 PURPOSE

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This procedure establishes requirements for cutting or burning operations.

### 3.0 REQUIREMENTS

- 3.1 The site safety officer is to ensure the hot work permit for any flame- or spark-producing operation. This procedure is to be conducted daily whenever such operations occur.
- 3.2 This procedure is to be read and complied with by any employee conducting hot work.
- 3.3 The EARTH TECH site supervisor or site safety officer will complete the following procedures prior to beginning hot work:
  - 3.3.1 Conduct a visual inspection of area. Remove any combustible material surrounding the work area. Special attention will be paid to area where hot slag can fall or spatter. Any combustible material which cannot be readily removed will be covered or otherwise protected from the hot materials. For example, covering a combustible surface with 1 inch of soil or wetting it may be sufficient.
  - 3.3.2 Designate a fire watch. This person's sole responsibility will be to monitor the welding or burning operation and have sufficient size and type for the potential combustible material. In addition, this person shall be trained in the proper use of the appropriate fire extinguisher and be knowledgeable of the emergency signal and evacuation procedures as well as emergency shut down procedures.
  - 3.3.3 Do not begin until all spaces, pipes, and sumps have been opened and tested for the presence of flammables. If any flammable or combustible vapors exceed 10 percent lower explosive limits (LEL), no work will begin until levels are reduced. As a rule, no hot work will begin when any combustible vapor is present.
  - 3.3.4 Personnel working in the area of the hot work will be alerted to the fact that hot work is taking place.
  - 3.3.5 A hot work permit will be completed and posted.

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#### 4.0 BURNING OPERATION SAFETY RULES

- 4.1 Wear adequate flame and heat-resistant apparel and appropriate eye protection. This includes chipping operations.
- 4.2 Ensure that the area below is roped off and posted if work is overhead.
- 4.3 Protect personnel and equipment in near vicinity against exposure from arc or sparks.
- 4.4 Observe good housekeeping practices; keep excess hoses, cables, and equipment out of aisle ways, stairways, and your work station.
- 4.5 Never use oil, grease, or pipe fitting compounds to make up connections on oxy-acetylene welding equipment.
- 4.6 Store fittings in the manner to prevent contamination.
- 4.7 Do not interchange oxygen and acetylene hoses; oxygen is coded green and acetylene is coded red.
- 4.8 Do not force connections or strike or force valve wheels.
  - 4.8.1 Before connecting cylinders, read the label to ensure that the proper gas is being used.
  - 4.8.2 Cylinders must not be placed where they might form part of an electrical circuit. Keep cylinders away from grating, layout tables, and piping systems that may be used for ground of electrical welding circuits.
- 4.9 Open oxygen valves momentarily to remove dust or dirt; stand on one side of the valve and avoid contact of gas with any combustible material.
  - 4.9.1 Pressure-adjusting screws on regulators will be fully released before the regulator is attached to a cylinder and the cylinder valve opened. Open the cylinder valves slowly; stand to one side, not in front of pressure regulator gauge faces when opening cylinder valves.
  - 4.9.2 Do not use adjustable wrenches on acetylene cylinders; use the T-wrench provided. Keep it in place at the cylinder.
  - 4.9.3 Never open an acetylene cylinder valve more than one and one half turns.
- 4.10 Do not store tools or equipment in the recessed top of an acetylene cylinder, and do not allow water to accumulate there.



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- 4.11 Inspect the welding hose for defects before each use. Keep hoses clear of equipment and hot slag.
- 4.12 Do not use oxygen for cleaning, pressurization, or for ventilation.
- 4.13 Do not relight flame on hot work when in an enclosed space. Allow time for gases to escape and then use friction lighter.
- 4.14 A metal part which is suspiciously light probably has a void inside and an opening should be drilled before heating. Electrical boxes at the end of conduit should be opened prior to cutting conduit. Valves on both ends of piping should be opened.
- 4.15 Never lay work that is to be heated or welded on a concrete floor because when sufficiently heated, concrete may spill and fly with danger of injury.
- 4.16 Do not cut material in such a position that severed parts will fall striking legs or feet of the operator or assistant, or damage gas lines.
- 4.17 When a flashback occurs, both gases should be shut off first oxygen, then acetylene. Before lighting the torch again, see that it is cool and that no damage has been done to the torch, hose, or regulator.
- 4.18 Mark work "HOT" if left unattended or where others may come in contact with hot surfaces.
- 4.19 When burning operations are to be stopped for a few minutes during the course of the work, it is permitted to close torch valves only. When work is stopped for a longer period or is left unattended, the following steps must be taken:
  - Close oxygen and acetylene cylinder valves
  - Open torch valves to relieve pressure, then close again
  - Release regulator pressure adjusting screws
- 4.20 Before regulator is removed from a cylinder, the cylinder valve will be closed and the gas released from the regulator.

# 5.0 PERSONAL PROTECTIVE EQUIPMENT

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The normal personal protective equipment worn when working with hazardous materials generally provide inadequate protection from flames or heat. The person performing the work shall supplement the existing equipment with the following:

- Welding gloves fashioned from leather or other fire-resistant material;
- Apron or jacket fashioned from leather or other fire-resistant material;
- Chaps, if necessary, for leg protection; and



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Eye protection <u>and</u> face protection. Note: Normal chemical protective clothing is inappropriate for fire situations.

### 6.0 HOT WORK PERMIT

- 6.1 No employee of EARTH TECH is to begin hot work unless a hot work permit has been obtained. It is the responsibility of the project supervisor to request this permit. The hot work permit shall be signed by the supervisor and site safety officer and explained to each affected employee.
  - 6.1.1 It is the responsibility of the project supervisor to see that workers comply with all safety practices of the hot work permit.
- 6.2 The hot work permit will be valid for a single work shift only. On projects requiring more than a single work shift, a new permit shall be completed at the start of each shift. The permit shall be displayed at the project site.
- 6.3 At the conclusion of the project, the hot work permits will be forwarded to the site project control technician and placed in the project file.

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# **HOT WORK PERMIT**

Da	te: Person Completing (print):			
Object on which hot work is to be performed:				
		YES	NO	NA*
1.	Are all combustible materials and other fire hazards within 35 feet of the intended hot work perimeter removed?			
} <del></del> -	If yes to question 1, go to question 2. If no, answer the following:			
	Are appropriate guards installed to protect any remaining combustible/fire hazards from heat, sparks and slag.			
	Is a trained fire watch assigned for the duration of the project? Complete question 6 below.			
2.	Has the hot work area been inspected to determine if there are any floor/wall openings or cracks?			
3.	Have any identified floor/wall openings (including open doors windows) or cracks been closed? If not:	,		
	Have precautions been taken so that no combustible/flammable materials on the floor below, in the wall(s) or in adjacent room will be exposed to sparks, heat or slag.			
	Are suitable class fire extinguishers available at the hot work site?			
Com Com	Do any of the following conditions exist: abustible/flammable materials within 35 feet (refer to question 1).  r/wall openings or cracks within 35 feet of the hot work which could not be closed abustible/flammable materials are more than 35 feet away, but are easily ignited. abustible/flammable materials are in adjacent rooms (or in use is adjacent rooms), and, heat conduction through the wall floor/ceiling can ignite the material.			
	s for any of the above, a fire watch shall be assigned, and tion 6 answered.			

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YES NO NA\* 6. Fire Watch assigned has: Been trained in the duties, and in the use if the available fire extinguishing equipment. An appropriate fire extinguisher available for use. Been made familiar with the location and use of available alarm facilities. Been assigned to be onsite prior to the start of the hot work, and for a minimum of 1/2 hour after hot work completion. 7. Will hot work be performed on piping systems which either contact combustible materials (i.e. walls), can transmit heat to compressed cylinders, or contain combustible/flammable materials? If so, has the piping system been isolated to prevent heat transmission to the combustible material, or, to the compressed gas cylinder? If the pipe contained combustible/flammable material, has the pipe been purged or inerted? 8. Will the hot work be performed in a confined space? If yes: Has all the requirements for confined space entry been performed? Readings for the Lower Explosive Limit (LEL) are less than

I have inspected the work site, and have verif	ied the above information.
Response Manager** (print)	Response Manager** (signature)
Expiration date of this permit:	
* not applicable	
** or SSO	

# **HOT WORK PERMIT**

Date:	Time:
Location:	
Issued to:	
Site Safety Officer:	
Supervisor	
Do not cut or use other ope taken.	n-flame or spark-producing equipment until the following precautions have been
Protective Equipment used	
	<del></del>
(Initial Each Item)	
	The location where the work is to be done has been personally examined.
	Any available fire protection systems are in service.
	There are no flammable dusts, vapors, liquids or unpurged tanks (empty) in the area.
	Explosimeter reading <10% LEL.
	All combustibles have been moved away from the operation, or otherwise protected with fire curtains or equivalent.
	Ample portable fire extinguishing equipment has been provided.
	Arrangements have been made to patrol the area for at least \( \begin{aligned} \text{hour after} \) the work has been completed.
	The phone number for the local Fire Department is
This form must be filled out	daily whenever HOT WORK is being conducted and posted at the job site.

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HEALTH AND SAFETY PROCEDURES			
SUBJECT:	LOCKOUT/TAGOUT	NUMBER: 21	PAGE: 1 OF: 3
		DATE PUBLISHED:April 23, 1991	
		DATE REVISED:Ma	y 5, 1994

# 1.0 POLICY

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Equipment will be removed from service via lockout/tagout when the unexpected or inadvertent movement of machine or materials or energizing of circuits poses a threat to worker safety.

### 2.0 PURPOSE

This procedure establishes the minimum safety requirements to ensure the proper deactivation of movable, electrically energized, pressurized equipment and systems, and systems containing hazardous materials prior to repairing, cleaning, oiling, adjusting or similar work.

# 3.0 SCOPE

This procedure applies to all equipment that receives its energy from electrical power, hydraulic fluid under pressure, compressed air, steam, energy stored in springs, potential energy from suspended parts, or any other source that may cause unexpected movement when it is necessary to perform work on that system. It also applies to similar functions performed on systems containing hazardous materials.

#### 4.0 **DEFINITIONS**

- 4. Lockout is the use of a locking device, usually unlocked by a key, that is affixed to the prime source of energy of a piece of equipment or the source of systems containing hazardous materials. The locking device shall be used to prevent undesired movement or flow of material.
- 4.2 Tagout is the use of a Danger Tag (facsimile of the "Danger Do Not Operate" tag is shown following this procedure) that is always to be affixed to the prime source of energy of a piece of equipment or source of systems containing hazardous materials in such a manner that it cannot be accidentally removed. On the tag should be written the reason for shutdown and must contain the name of the person hanging the tag and date it is hung. The tag only is sufficient when the equipment is incapable of being locked out provided the equipment is disconnected from its source of energy.
- 4.3 Authorized personnel is the person or persons who lockout/tagout equipment and their immediate supervisor. NO ONE is permitted to remove a lock or a tag except the authorized personnel.
- 4.4 Extension tools, such as swabs, brushes, scrapers, or other methods or means to protect personnel from injury, may be used where it is clearly impossible to shutdown equipment for servicing. These conditions may exist only upon supervisory permission and personnel training.
- 4.5 Low voltage is voltage below 600 volts. Where applicable to energized circuits, this procedure applies to low voltage only.



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# 5.0 REQUIREMENTS

- 5.1 The supervisor having jurisdiction over personnel assigned to perform maintenance functions has the responsibility to provide lockout devices and hanger tags and to train personnel in their use.
- Where a job requires more than one craft or employee to accomplish, each employee is responsible to hang their own lock and/or tag.
- 5.3 All crafts, departments, and shifts involved must be notified of a shutdown requiring lockout/tagout.
- 5.4 UNAUTHORIZED REMOVAL OF LOCK OR DANGER IS A SERIOUS BREACH OF SAFETY REGULATIONS.
- 5.5 Machinery or equipment capable of movement must be stopped and the power source deenergized or disengaged and, if possible, the movable parts that may present a hazard shall be mechanically blocked or locked to prevent inadvertent movement during any work on that system.
- 5.6 Every prime mover or power driven machine equipped with locking controls or readily adaptable to locking controls must be locked out or positively sealed in the OFF position during work operations. Machines or prime movers not equipped with locking controls, or not readily adaptable to locking controls, must be de-energized or disconnected from their source of power, or other action which will prevent the prime mover or machine from inadvertent movement. In all cases, danger tags shall be placed on the controls of the machines and prime movers during repair work.
- 5.7 All electrical equipment and systems are to be treated as energized until tested or otherwise proven to be de-energized.
- 5.8 Electrical equipment and systems must, where possible, be de-energized prior to commencing work on them. The disconnect means is to be locked in the open position or other positive methods or procedures implemented which will effectively prevent unexpected or inadvertent energizing of a designated circuit, equipment, or appliance. "Danger" tags shall be used in all cases and may be used alone where it is not practical or possible to lockout the system.
- Work on energized parts of equipment or systems may be performed only after the following conditions have been met:
  - Responsible supervision has determined that it is necessary to work on energized equipment or systems, and the Health and Safety Manager has approved of the operation.



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- Involved personnel have received instructions on the work techniques and hazards involved in the particular task to be performed.
- Suitable personal protective equipment, such as gloves and eye protection, are provided and used.
- 5.10 Systems or equipment may be pressurized with various media, such as air, gas, steam, and/or hydraulic fluid in the form of water or oil.

The pressurizing, source, such as compressors, pumps, boilers, etc., shall be shut down and locked out and/or tagged out.

- 5.11 Pipes or lines that convey pressurized substances shall be bled to atmospheric pressure prior to opening the system.
- Once the system has been bled to atmospheric pressure the pipes or lines shall be disconnected, blinded, or closed by a valve and locked out and/or tagged accordingly. Observe line entry procedures.
- 5.13 A system, or portion of a system, containing hazardous materials that is to be serviced shall be drained from the lowest elevation, and if hot, allowed to return to ambient temperature prior to commencing work. Containers of compatible material must be used along with appropriate ventilation/scrubber systems. Once the system has been determined to be safe to commence work, pipes or lines shall be disconnected blinded or closed by a valve, and locked out and/or tagged accordingly.
- 5.14 Some equipment may have several sources of energy, such as electrical motors, hydraulic pressure, and may contain hazardous materials. Each source of energy must be considered separately and protected appropriately.
- 5.15 Where a job requires more than one craft or more than one employee to accomplish, each employee shall hang their own lock and/or tag.
- 5.16 After completion of a job requiring more than one employee each employee is responsible to remove their own lock or tag. The only other person authorized to remove a lock or tag is the site supervisor.
- 5.17 The supervisor who has overall responsibility of the job is responsible to ensure all that locks and/or tags have been removed prior to re-activating the system or equipment.

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# HEALTH AND SAFETY PROCEDURES SUBJECT: NUMBER: 22 PAGE: 1 OF: 2 DATE PUBLISHED:April 23, 1991 DATE REVISED:May 5, 1994

# 1.0 POLICY

Employees are not to work in or around excavations unless excavations are properly shored or sloved.

# 2.0 PURPOSE

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This procedure outlines requirements for excavating soil and is intended to protect personnel from the hazards of excavation collapse.

# 3.0 GENERAL REQUIREMENTS

Safety operations while working in and around excavations involve many factors. Factors to be evaluated and discussed at daily safety meetings before starting work include:

- 3.1 <u>Soil Structure:</u> Excavations in wet soil, sandy soil, or areas that have been backfilled are relatively unstable and must be supported or sloped if employees are to enter the excavation.
- 3.2 <u>Weather Conditions:</u> Changing weather conditions greatly affect the safety of working in and around excavations. Excess water from rain or snow loosens the soil, increasing the chance of the soil caving in. Excavation should be diked, pumped, or covered, to prevent an excessive amount of water from accumulating.
- 3.3 Superimposed Loads: Superimposed loads in the vicinity of excavation walls increase the probability of a cave-in. Heavy equipment and materials should be kept back as far as possible. Heavy equipment should be placed on wooden mats or planking to spread the weight more evenly. Considerations must also be taken when buildings, curbs, trees, utility poles, and other structures are around the excavation. Soil excavated must be stored away from the edge and be barricaded or retained in an effective manner.

# 4.0 SPECIFIC REQUIREMENTS

Specific requirements in this safety plan are minimum regulations which are contained in 29 CFR Subpart P 1926.65, 1926.651, and 1926.652 OSHA Safety and Health for Construction.

- 4.1 Walkways and sidewalks shall be kept clear of excavated materials. Sidewalks which must be undermined must be shored to carry a load of 125 pounds per square foot.
- 4.2 Planks used for walkways shall be laid parallel to the length of the walkway and fastened together.
- 4.3 Employees subjected to vehicle traffic in excavating operations shall don reflective clothing.

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- 4.4 Excavations shall be inspected; if the possibility of cave-in or slide exists, employees shall exit the space until proper precautions have been taken.
- 4.5 Prior to opening an excavation, all efforts shall be made to locate all underground utilities. The utilities shall be marked.
- 4.6 Excavations deeper than 5 feet which are entered by employees shall be sloped, shored, or protected by some other equivalent means.
- 4.7 Excavations below the level of the base of footings of a subsurface structure shall not be permitted, unless the wall is underpinned.
- 4.8 When employees are required to work in an excavation 4 feet or deeper, a ladder shall be provided. The maximum horizontal travel distance to the ladder shall be 25 feet. The ladder shall extend a minimum of 3 feet above the excavation and be secured. This ladder shall not be removed until all employees have exited the excavation.
- 4.9 Guardrail or fences shall be placed at all excavations which are close to sidewalks, drives, or other thoroughfares. Adequate protection shall also exist at remote excavations where workers are not present.
- 4.10 Excavated soil must be kept at least 2 feet from the edge of the excavation.

# 5.0 ANGLE OF REPOSE

- 5.1 OSHA requires that all excavations more than 5 feet deep which will be entered by employees shall be shored, sheeted, braced, or supported.
- 5.2 The preferred method is to slope the sides of the excavation to the angle of repose, or the angle of control at which the soil will remain at rest. The angle of repose varies with different kinds of soil; this angle must be determined on each individual excavation.
- 5.3 The second method of support is shoring, sheeting, tightly placed timber shores, bracing, trench jacks, piles, or other materials installed in manner strong enough to resist the pressures surrounding the excavations.
- 5.4 The third method is to use a trench box, which is a prefabricated movable trench shield made of steel plates, welded to a steel frame.

# 6.0 APPROVAL

The Site Safety Officer or Corporate Health and Safety Manger is to approve all shoring or sloping prior to personnel entry.

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# HEALTH AND SAFETY PROCEDURES SUBJECT: UNDERGROUND TANK REMOVAL DATE PUBLISHED: April 23, 1991 DATE REVISED: May 6, 1994

# 1.0 POLICY

All underground tank removal projects will be conducted according to this procedure. A site safety plan will be prepared which addresses the points discussed in this procedure.

# 2.0 PURPOSE

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This procedure outlines the steps necessary to ensure the safe removal of underground tanks.

# 3.0 SITE ASSESSMENT

- 3.1 Visually inspect the site to ensure that the work can be safely done. Special attention must be given to safe work surfaces for equipment, the presence of overhead lines which may hinder equipment operation, and local traffic which may be affected.
- 3.2 Call the local utility companies to locate telephone, power, water, and sewer lines which may be in the way of excavation. Ensure they are well marked before excavation.
- 3.3 Locate the tank, together with piping, vents, and manways.
- 3.4 Sample the tank to verify that the tank contains the product which was indicated. Note liquid levels. Check for the presence of water an other contaminants.
- 3.5 Sample the tank vapor space with 02/LEL meter to verify safe/unsafe conditions.

# 4.0 TANK EXCAVATION

- 4.1 Establish the boundaries of the exclusion zone so that unprotected personnel will not accidentally come in contact with any possible liquid splashes or vapors arising from the excavation.
- 4.2 Ensure that all walking/working surfaces and area are in a safe condition. A firm footing for equipment and personnel must be established on the overburden. If not, the areas need to be stabilized. If it is possible for excavation of hoisting equipment to contact overhead power lines, then these will need to be de-energized prior to beginning operations. Note that for tracked vehicles, the proper alignment with an excavation is to have the tracks perpendicular to the excavation.
- 4.3 While the overburden is being removed, if free product or saturated soil is likely to be contacted, then a proper storage area for this spoil material must be designated. This area may need to be lined and diked. If free product or saturated soils are found, both toxic and flammable readings shall be taken at the work site and perimeter.
- 4.4 The excavation wall may have to be sloped or shored to ensure that the walls do not collapse. Remember that an excavation above shoulder level is considered a confined



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space. These are definite OSHA standards for both excavations and confined space entry which we addressed in EARTH TECH Health and Safety Procedures.

- 4.5 If personnel enter the excavation, they shall use the proper protective equipment, and follow confined space entry procedures, as appropriate.
- 4.6 If open excavations are left unattended, proper barricades and warning signals shall be set up to actively warn all personnel of the open pit hazard. In certain areas, additional security measures may need to be instituted in the form of fences or security guards.

# 5.0 TANK REMOVAL

- 5.1 All products will be removed by pumping (if possible).
- 5.2 If the tank atmosphere is flammable, the tank shall be inserted prior to removal. This can be done by introducing nitrogen or dry ice (CO<sub>2</sub>) until the oxygen content is 8% or less, or "foamed" with fire fighting or vapor suppression foam to suppress vaporization, along with ventilation to below 10% LEL. Depending on the situation and product, one method may be preferred to the other (a description of each method is given under the Safety Certification).
- 5.3 If possible, all lines will be removed by disconnecting joints rather than cutting or burning. No hot work will be performed without a hot work permit issued after LEL testing.
- 5.4 The tank will then be carefully lifted and moved to the decontamination area for decontamination. Note that the shears should not be used for lifting, but only for cutting the tank since the weight of the shears approach the maximum lifting capacity of the Caterpillar 215/225.

#### 6.0 TANK DECONTAMINATION

- 6.1 Decontamination is required to remove residue from the tank, so the tank can be disposed of as a clean material, or shipped safely.
- 6.2 The decontamination area will be marked as an exclusion zone. Proper personnel, protective equipment, medical emergency equipment, splash shower, and eye wash, should be available.
- 6.3 Before opening the tank to permit entry for water blasting, foaming, or other cleaning methods are used, the tank will again be checked for the presence of flammables and appropriate actions taken to reduce flammable levels. Confined space entry procedures apply.



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- 6.4 Personnel will wear PVC splash suits with respiratory protection appropriate to the hazards.
- 6.5 A method for rinse water containment and proper disposal procedures will be established.

# 7.0 SAFETY CERTIFICATION BEFORE CUTTING TANKS

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- 7.1 The preferred method of cutting (rendering) tanks is to use the power shears attached to a boom vehicle. The less preferred method is to use a cutting torch. A power metal chisel may also be used. The primary hazard when cutting tanks, using either the shears, cutting torch, or chisel is the possibility of catapulting metal pieces must also be considered. Whenever tanks are cut, all unnecessary personnel should be removed from the area. The possibility of explosion of flammable vapors should always be considered.
- 7.2 Sample the tank atmosphere for flammables and oxygen. Before a tank can be cut with either shears, cutting torch, or chisel, the tank atmosphere must be less than 10% LEL or less than 8% O<sub>2</sub>. If the tank atmosphere contains flammable vapors in excess of 10% LEL, then some action must be taken to reduce the flammable vapor concentration or reduce the oxygen concentration to less than 8% O<sub>2</sub>.

Air monitoring equipment should respond to the specific gas encountered. Never use non-intrinsically safe equipment such as a photoionization detector (PID) in a potentially explosive environment.

7.3 If the tank atmosphere is greater than 10% LEL, one of these actions can be taken to make the tank safe for cutting.

<u>Ventilate the Tank:</u> This procedure only will work with fairly clean products. (The tank will re-gas rapidly if not a clean product). Readings should be taken at the location of the tank exhaust to check for flammables. Note that exhausted vapors may be flammable, toxic, or require respiratory protection.

Clean and Ventilate the Tank: Use a cleaning method such as butterworthing with hot water, pump out liquids, and then ventilate as above.

Inert the Tank: Nitrogen from a liquid nitrogen tank, or carbon dioxide from dry ice can be used to inert the atmosphere in the tank to below the oxygen concentration necessary for combustion. Note that flammable vapors will still be present; and once the tank is cut or opened, the inert gas can be lost. The atmosphere must be diluted to less than 8% O<sub>2</sub> by volume to be completely safe for normal petroleum products. A LEL meter must be used to verify the O<sub>2</sub> concentration. Measurements must be made continuously. The quantity of inert gas which must be used depends on how the gas is presented to the tank. In practice, about 6 to 8 and perhaps as many as 10 tank volumes would be required, depending on how the material is administered. If dry ice is used approximately, 11.5 pounds of dry ice per 100 cubic feet (15 pounds per 1,000 gallons) of tank volume is required to reduce the oxygen to 8%. There are several precautions which must be

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observed when using dry ice. The material is extremely cold - 109.3 F. Also, the CO<sub>2</sub> produced will be absorbed into any water present, thus effectively increasing the oxygen concentration.

7.4 <u>Foam the Tank:</u> If product cannot be totally removed a method which has proven successful is to "foam" the surface of the remaining liquid with a fire fighting or vapor suppression foam. This foam blend should be 3 inches or 4 inches thick and will have the effect of suppressing vaporization of the volatile material.

The foam must be applied through a tank opening and thus the tank must be opened. After laying the foam blanket, the tank may have to be ventilated so that the vapor flammable concentration is reduced to less than 10% of the LEL on the combustible gas indicator. In extreme cases, high expansion foam can be used to completely fill the tank. Obviously, no ventilation will be necessary in this case.

- 7.5 The general rule of thumb for cutting tanks with a cutting torch is that cutting slag should never be allowed to fall into free product.
- 7.6 Naturally when cutting tanks by any method, appropriate fire protection should be available.

### 8.0 OTHER SITUATIONS

Under certain situations, the tank may need to be opened and cleaned before removal. In this case, a reordering of steps is appropriate. These are previously discussed:

- Remove pumpable product
- Test tank interior for flammables
- If flammable, inert and purge
- Retest atmosphere and repeat until safe
- Open tank
- Retest atmosphere for flammables and toxics
- Clean as much as possible remotely with equipment
- Allow properly protected personnel to enter for final steps

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# HEALTH AND SAFETY PROCEDURES SUBJECT: NUMBER: 24 PAGE: 1 OF: 2 DATE PUBLISHED: April 23, 1991 DATE REVISED: May 6, 1994

#### 1.0 POLICY

All users of high-pressure washers will comply with this procedure. The pressure washer is a very effective but potentially dangerous piece of equipment. Only trained, authorized personnel will operate the high-pressure washer.

### 2.0 PURPOSE

This procedure describes requirements for the safe operation of the high-pressure washer.

# 3.0 PERSONAL PROTECTIVE EQUIPMENT

The following equipment will be worn by operators and assistants:

- Safety shoes or boots;
- Metal foot and shin guards;
- Hearing protection;
- Eye protection (goggles and face shield);
- Hard hat with faceshield;
- PVC rain suit or PVC acid suit;
- Heavy gloves such as monkey grips; AND
- chemical protective equipment may also be required.

# 4.0 PROCEDURE

- 4.1 Only trained, authorized personnel will operate the high-pressure washer.
- 4.2 The lance must always be pointed at the work area.
- 4.3 The operator must maintain good footing.
- 4.4 The operator must have an assistant to aid in moving the hose to different areas and backing up the operator. The assistant must remain in back of the operator.
- 4.5 Non-operators must remain a minimum of 25 feet from the operator.
- 4.6 The operating pressure should never exceed that which is necessary to complete the job.
- 4.7 No unauthorized attachment may be made to the unit. (The trigger should never be tied down.)
- 4.8 Operators should be changed at frequent intervals to avoid fatigue (at least hourly).
- 4.9 Equipment should be cleaned often to avoid dirt buildup, especially around the trigger and guard area.



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- 4.10 An assistant should always be standing by at the pressure generator.
- 4.11 All users must be trained in emergency shut down procedures and general equipment maintenance.

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# HEALTH AND SAFETY PROCEDURES SUBJECT: NUMBER: 25 PAGE: 1 OF: 4 DATE PUBLISHED:April 23, 1991 DATE REVISED:May 6, 1994

# 1.0 POLICY

Site lifting activities shall comply with all Federal, state, and local laws as well as safe practices dictated by the crane's manufacturer and those deemed as established safe work procedures by the construction industry.

# 2.0 PURPOSE

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This procedure describes requirements for maintenance and operation of hoisting equipment.

# 3.0 GENERAL REQUIREMENTS

- 3.1 EARTH TECH will only use cranes and other hoisting equipment that is in safe working order. To maintain this policy, all crane equipment brought onto the project site will be inspected for structural integrity, smooth operational performance, and proper functioning of all critical safety devices in accordance with the crane manufacturer's specifications. This inspection will be performed by the EARTH TECH site supervisor and site safety officer, and the crane operator.
- 3.2 All equipment not conforming to the operational and safety requirements set forth during this inspection will not be put into service until all necessary repairs are made to the satisfaction of the inspection group. If any existing job cranes are to be used, they shall be inspected by a certified inspection agency prior to use.
- Only qualified crane operators familiar with the equipment to be used will be permitted to operate the crane. Subcontractors will supply proof of their operators' capability and experience to operate the crane in a safe manner. EARTH TECH reserves the right to remove from the project site any crane operator if there is a question or doubt concerning the operator's capabilities.
- All hooks, slings, and other fittings shall be of correct size for the work to be done and shall have sufficient strength to safely sustain the loads imposed on them.
- 3.5 Employees shall refrain from standing or walking beneath crane booms.
- In the event of emergency repair work of hoisting equipment with a suspended load, the area below the load shall be barricaded and the load blocked up or otherwise supported.
- 3.7 Employees are not to ride loads, hooks, medicine balls, or slings suspended from hoisting equipment.
- 3.8 Side pulls shall be avoided in all cases. The load must be directly under the hoist.
- 3.9 The safety latch on the hook of hoisting equipment must be in a closed position.



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3.10 Use of deformed or defective hooks, rings, pins, shackles, or other lifting attachments is prohibited. Chain or wire rope shall be free of kinks, sharp bends, or twists.

# 4.0 RIGGER COMPONENTS

- 4.1 Rigging components will be inspected daily by members of the rigging team. In addition, allowable wire breaks and wear on hoisting ropes will follow *The Handbook of Rigging for Construction and Industrial Operations*, third edition, W.E. Rossnagel.
- 4.2 Each sling is to be marked or tagged with its rated capacity.
- 4.3 Slings are not to be used with loads in excess of their rated capacity.
- 4.4 Wire-rope slings are to be immediately removed from service if any of the following conditions are present:
  - Six randomly distributed broken wires in one rope lay, or three broken wires in one strand in one rope lay.
  - Wear or scraping of 1/3 the original diameter of outside individual wires.
  - Kinking, crushing, bird caging, or any other damage resulting in distortion of the wire-rope structure.
  - Evidence of heat damage.
  - End attachments that are cracked, deformed, or worn.
  - Hooks that have been opened more than 15 percent or the normal throat opening, measured at the narrowest point, or twisted more than 10 degrees from the plane of the unbent hook.
  - Corrosion of the rope or end attachments.

# 5.0 CRANE OPERATORS

- 5.1 Since the crane is a specialized piece of heavy equipment, it warrants special safety protocols. It is policy to establish a crane and rigging safety program for all sites using this equipment.
- 5.2 Crane performance shall be according to the manufacturer's designs and established construction safe work practices. At no given time will crane operation be permitted out of the design specifications of the unit or the safety requirements deemed by Federal or state safety standards. The following safety policies will be enforced at all times during crane operations:



# HEALTH AND SAFETY PROCEDURES SUBJECT: CRANES AND LIFTING DEVICES DATE PUBLISHED:April 23, 1991 DATE REVISED:May 6, 1994

- Accessible areas within the swing radius will be barricaded to prevent employee injury.
- No crane will operate in a heavy lift mode without its outriggers fully extended to assure maximum stabilization of the equipment.
- All hand signals used will be in accordance to American National Standards Institute's (ANSI's) B30.5-68, "Basic Hand Signals for Boom Equipment Operation." Only one individual will issue operational hand signals to the crane operator unless it is established that relay hand signaling for blind craning situations is required.

# **Load capacity limitations:**

- All load weights are to be estimated to within ±5 percent for all critical lift operations. All hoisting capabilities of the crane in use will be according to the load capacity chart specified by the manufacturer. Load weight will be calculated with all rigging components considered as part of the load.

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- Tag lines for controlling loads will be used at all times. Suspended loads, regardless of the size and weight, will not be hoisted over employees.
- The operator and rigger will ascertain that a load is properly secured and balanced before it is lifted more than a few inches off the floor or surface.
- 5.3 <u>Lift Strategy:</u> To address different types of lifts, a lift strategy plan has been established by EARTH TECH. Under this plan, EARTH TECH will use the crane's load capacity and specific rigging requirements to classify the lift. Under these guidelines, various lift strategies will be followed.
  - General Lifts: General lifts are small-scale hoisting activities which require daily rigging inspection. To distinguish what items are considered general lifts, the load capacity chart of the specific crane in use will be the criteria. General lifts for this plan are those lifts that do not exceed the crane's load capacity rating in its least stable, but safe operating position.
  - Major Lifts: Major lifts are those that require the attention of the Supervisor or his designated representative to review the lift and rigging operations during the actual lift. Major lifts are those that are less than 75 percent of the crane's upper load rating on the load capacity chart. Major lifts may also include those lifts with unusual configurations that require special attention in rigging.



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- Critical Lifts: Critical lifts are those which exceed 75 percent of the crane's load capacity rating. Critical lifts will not be enacted until an overall lift review detailing all weight calculations and lift strategy has been conducted.
- 5.4 Direct supervisory and safety supervision will be mandatory for all major and critical lifts.

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#### 1.0 POLICY

Only trained and authorized operators shall be permitted to operate industrial forklifts and tow motors.

#### 2.0 PURPOSE

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This procedure establishes minimum standards for the safe and efficient operation of forklifts and tow motors.

# 3.0 REQUIREMENTS

- 3.1 Operators of forklifts and tow motors must be trained and authorized.
  - 3.1.1 To qualify for a new license, the employee must:
    - Wiew both training videos;
    - Complete field training; and
    - Successfully pass a road test.
  - 3.1.2 An annual retraining consisting of viewing the videos is necessary for recertification.
  - 3.1.3 All operators of forklifts and tow motors will receive an Industrial Lift Truck Card authorizing their use of such equipment. This card is to be in the operator's possession whenever using this equipment.
- 3.2 Each driver is to check his vehicle at least once per shift. If it is found to be unsafe, the matter shall be reported immediately to his supervisor, and the vehicle not put in service again until it is repaired. Attention is to be given to the proper functioning of tires, horn, lights, battery, brakes, steering mechanism, and the lift system of forklifts.
  - 3.2.1 The Forklift and Tow Tractor Checklist, reproduced following this procedure, is to be used to satisfy the requirements of this paragraph. Checklists should be kept with the vehicle or in the supervisor's office and maintained for a period of six months by the supervisor.
- 3.3 The authorized or safe speed is not to be exceeded. Each driver is to maintain a safe distance from other vehicles, keeping his vehicle under positive control at all times. All established traffic regulations are to be observed. For forklifts travelling in the same direction, a safe distance may be considered to be approximately 3 lengths, or preferably a time lapse three seconds passing the same point.
- 3.4 Stunt driving and horseplay are prohibited.
- 3.5 Loaded vehicles are not to be moved until the load is safe and secure.



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3.6 When a driver leaves a vehicle unattended, the power must be shut off, brakes set, the mast brought to the vertical position, and forks left in the down position. When left on an incline, the wheels must be blocked. Keys are to be removed from vehicles parked in isolated areas.

**Note:** Do not depend on a seat brake unless that is the only parking brake on the equipment. Always use hand brake, if available.

- 3.6.1 A powered industrial forklift is unattended when the operator is 25 feet or more away from the vehicle which remains in his view, or whenever the operator leaves the vehicle and it is not in view.
- 3.6.2 When the operator of an industrial forklift has dismounted and is within 25 feet of the vehicle still in his view, the load-engaging means must be fully lowered, controls neutralized, and the brakes set to prevent movement.
- 3.7 Forklifts are not to be driven up to anyone standing in front of a fixed object of such size that the person could be caught between the vehicle and object.
- 3.8 Operators are to look or face in the direction of travel and not move a vehicle until certain that all persons are in the clear.
- 3.9 Vehicles are not to be operated on floors or platforms that will not safely support the loaded vehicle.
- 3.10 Riding on the forks of lift trucks is prohibited.
- Forks must always be carried as low as possible, consistent with safe operation (normally, approximately four inches above the running surface).
- 3.12 Extreme care is to be used when tilting loads.
- 3.13 Forklifts are not to be driven in and out of highway trucks and trailers at unloading docks until such trucks are securely blocked and brakes set.
- Employees must not place any part of their body outside the running lines of the forklift or between mast uprights or other parts where shear or crushing hazards exist.
- 3.15 Employees are not allowed to stand, pass, or work under the elevated portion of any forklift, loaded or empty, unless it is effectively blocked to prevent it from falling.
  - 3.15.1 The forks of a forklift are never to be used to elevate a person to a higher level, unless a proper platform with guardrails is provided and the platform is fastened to the mast.



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Railroad tracks are to be crossed diagonally, wherever possible. Parking closer than 8-lifet from the center line of the railroad track is prohibited.

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- 3.17 The width of one tire on the forklift is the minimum distance from the edge to be maintained while it is on any elevated dock, platform, or freight car.
- 3.18 When forklifts are used to open and close freight car doors, the following provisions must be observed:
  - 3.18.1 A device specifically designed for opening or closing freight car doors is to be attached to the forklift.
  - 3.18.2 The force applied by the device to the freight car door is to be applied parallel to the direction of travel of the freight car door.
  - 3.18.3 The entire door opening operation must be in full view of the operator.
  - 3.18.4 The forklift operator and other dock employees must be clear of the area where the door might fall while being opened.
- 3.19 Prior to driving onto trucks, trailers, and railroad cars, their flooring must be checked for breaks and other structural weaknesses.
- 3.20 Other forklifts travelling in the same direction are not to be passed at intersections, blind spots, or dangerous locations.
- 3.21 Drivers are to slow down and sound the horn at cross aisles and other locations where vision is obstructed.
- 3.22 If the load being carried obstructs forward view, the drivers are to travel with the load trailing.
- 3.23 Grades must be ascended or descended slowly.
  - 3.23.1 When ascending or descending grades in excess of 10 percent, loaded forklifts must be driven with the load upgrade.
  - 3.23.2 On all grades, the load and load-engaging means are to be tilted back if applicable, and raised only as far as necessary to clear the road surface.
- 3.24 Forklifts must not be loaded in excess of their rated capacity.
- 3.25 Forklifts are not to be operated with a leak in the fuel system.
- 3.26 Extreme care is to be taken when tilting loads. Tilting forward with the load engaging means elevated is prohibited except when picking up a load. Elevated loads are not to be



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tilted forward except when the load is being deposited onto a storage rack or equivalent. When stacking or tiering, backward tilt is limited to that necessary to stabilize the load.

- 3.27 The load-engaging device must be placed in such a manner that the load will be securely held or supported.
- 3.28 Special precautions are to be taken in the securing and handling of loads by forklifts equipped with attachments, and during the operation of these vehicles after the loads have been removed.
- 3.29 The wearing of seat belts is <u>mandatory</u> when operating any type of industrial tractor equipped with roll-over protective structure (ROPS).
- 3.30 "Operating Rules for Industrial Trucks" (Forklift and Tow Tractors) shall be posted where such equipment is used. "Employee Operating Instructions" for Industrial Tractors are included.

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# DAILY INSPECTION FORKLIFTS AND TOW MOTORS

Item (nspected	Week of:
	Monday Tuesday Wednesday Wednesday Friday Sunday Sunday In using Sunday
Tires	Monday
Steering	Tuesday
Foot Brake	Wednesday
Hydraulic System	Thursday
Oil	Friday
Horn	Saturday
Chains	Sunday
Mast	
Carriage	
Fork Adjusting Slides	Operators Must Sign In
Name Plate	
General Condition	
Fire Extinguisher	
Fuel Connection	
Clear of Extraneous Materials	
Lights	
Control	
Any discrepancies must be reported  Keep all body parts inside t	he Cage!

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# FORKLIFT TRAINING/QUALIFICATIONS

Employee Name:	
Department:	
Previously Licensed: Yes No	Date
Video Training (Operation) Viewed On:	Date
Video Training (Inspection) Viewed On:	Date
Field Training:	Date
Road Test Given By:	Date
Pass Fail	
License Issued By:	Date

To Qualify For a New License Employee Must:

- View Both Training Videos; or
- Complete Field Training; and
- Successfully Pass Road Test.

To Requalify For a License (Annually):

• Employee Must View both Training Videos.

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PORTABLE LADDERS AND WORK PLATFORMS	DATE PUBLISHED:April 23, 1991  DATE REVISED:May 12, 1994	

# 1.0 POLICY

Construction of wood or metal step ladders must meet applicable OSHA requirements and ANSI Standards and must not exceed 20 feet in height. Elevated work platforms must comply with this precedure.

# 2.0 PURPOSE

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This procedure establishes criteria for the procurement, construction, care and use of portable ladders and work stands in order to ensure personnel safety under normal conditions of usage.

# 3.0 CARE AND USE OF LADDERS

- 3.1 Ladders are to be maintained in good condition at all times. The joint between the steps and side rails must be tight, all hardware and fittings securely attached, and the movable parts must operate freely without binding or undue play.
- 3.2 Safety feet and other auxiliary equipment are to be kept in good condition to ensure proper performance.
- 3.3 Ladders shall be stored in such a manner as to provide ease of access or inspection, and to prevent danger of accident when withdrawing a ladder for use.
  - Ladders are to be stored on racks designed to protect the ladder when not in use. These racks must have sufficient support points to prevent any possibility of excessive sagging.
- When not in use, wooden ladders shall be stored at a location where there is good ventilation, but where they will not be exposed to the elements.
- 3.5 Ladders carried on vehicles shall be adequately supported to avoid sagging and securely fastened in position to minimize chafing and the effects of road shocks.
- 3.6 Wooden ladders shall be kept coated with a suitable protective material. Painting of ladders is permissible provided a clear finish is used.
- 3.7 Ladders are to be maintained in good usable condition at all times. Hardware fittings and accessories must be checked frequently and kept in good working condition.
- 3.8 Ladders are to be inspected and those which have developed defects are to be withdrawn from service for repair or destruction and tagged or marked "Unsafe, Do Not Use".
- 3.9 Ladders must not be placed in front of doors opening toward the ladder unless the door is blocked open, locked, or guarded.
- 3.10 Ladders must not be placed on boxes, barrels, or other unstable bases to obtain additional height.

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- 3.11 Ladders with broken or missing steps, rungs, or cleats, broken side rails, or other faulty equipment are not to be used. Improvised repairs are prohibited.
- 3.12 Tops of ordinary step ladders are not to be used as steps.
- 3.13 A ladder is not to be used to gain access to a roof unless the top of the ladder extends at least 3 feet above the point of support at eaves, gutter, or roof line.
- 3.14 The correct angle for using straight ladders is for the foot of the ladder to be placed from the wall a distance equal to one-fourth the effective length of the ladder. (Effective length = length of ladder from base to point of support.)
- On two-section extension ladders, the minimum overlap for the two sections is to be at least 3 feet for ladders up to and including 36 feet in length.
- 3.16 Personnel using ladders must:
  - Face the ladder while working;
  - Work only within arm's length of the ladder;
  - Use both hands when ascending or descending;
  - Allow no other person on the ladder; and
  - Use rope to raise or lower materials and tools.
- 3.17 A portable ladder is designed as a one-man working ladder based on a 200-pound load. The ladder base section is to be placed with a secure footing. Safety shoes of good substantial design are to be installed on all ladders.
- 3.18 Portable metal ladders or work platforms are not to be used in the vicinity of electrical circuits or in places where they may come in contact with them. They are to be legibly marked with signs reading "CAUTION DO NOT USE NEAR ELECTRICAL EQUIPMENT!" or equivalent wording.

# 4.0 MOBILE ELEVATED WORK PLATFORMS

- 4.1 Whenever a forklift is used to elevate employees for work positioning, a safe work platform having sufficient space to accommodate the employees and material being elevated, but having not less than 24-inch x 24-inch working space. is to be securely attached to the forks or mast in such a manner as to prevent tripping, slipping, or falling from the supports.
  - The platform must be equipped with standard guardrails, with midrails on all open or exposed sides, and toeboards are to be installed if work is performed where employees normally work or pass.
  - Where a clearance restriction or the nature of the work prohibits the use of guardrails, a safety belt or harness with lanyard must be used. The lanyard is to be attached to a point located above and near the center of the platform.



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- An operator is to be at the controls of the forklift while employees are on the elevated platform.
- The side of the platform nearest the mast frame truss shall be guarded. This guard shall consist of a substantial frame covered with 1/2 inch expanded metal, laminated safety glass, or equivalent providing effective guarding to a height of 7 feet.
- 4.2 If a forklift is to be operated under conditions which might expose the operator to danger from falling objects from the elevated work platform, the truck must be equipped with overhead protection.
- 4.3 Whenever elevating personnel, forklift operators must:
  - Wse a securely attached safety platform;
  - Make sure the lifting mechanism is operating smoothly;
  - 65 Place mast vertical and never tilt forward or rearward when elevated;
  - Place truck in neutral and set parking brake;
  - Lift and lower smoothly and with caution;
  - Watch for overhead obstructions:
  - Keep hands and feet clear of controls other than those in use; and
  - Never travel with personnel on the work platform other than to make minor movements for final positioning of the platform.
- For one-man type elevatable pneumatic or hydraulic lifts, means must be provided to render inoperative all operating controls other than those on the elevatable platform when the controls on the elevatable platform are being used. Only one set of controls is to be capable of being operated at one time.

Outriggers are to be used in all cases where such accessory controls are provided with the lift.

4.5 Guardrails are to be installed on all work platforms in excess of 30 inches in height. Toeboards are to be provided if the height of the platform exceeds 6 feet. Stairways (to platform) having four risers or more are to be equipped with handrails. Handrails are not required if the platform is less than 30 inches high.

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# 1.0 POLICY

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Earth Tech will follow standards set by the National Electrical Code and OSHA in selection of materials and methods of installation and maintenance. Only qualified personnel will work on electrical equipment.

# 2.0 PURPOSE

This procedure specifies the requirements for electrical equipment.

# 3.0 GENERAL REQUIREMENTS

- 3.1 No electrical work should be done "hot" if it can be done "cold."
- 3.2 Hot line work will be done only under specific authorization and direction from the site supervisor.
- 3.3 Approved rubber protection and "hotsticks" will be used as specified by the site supervisor.
- 3.4 Use proper clearance and grounding procedures and, when possible, all electrical circuits and equipment shall be de-energized before maintenance and repair work are started.
- 3.5 Single-phase electric hand tools and other single-phase, portable electrical equipment must be approved by Underwriters Laboratories, or another recognized testing agency, and all exposed non-current-carrying metal parts must be grounded or be double insulated.
- 3.6 Before each use, portable electrical appliances are to be examined for obvious deficiencies in the appliance, cord, or plug. If any deficiency is noted, the appliance is not to be used.
- 3.7 Extension cords are to be kept clean, dry and free of kinks, and protected from oil, hot or sharp surfaces, and chemicals. Extension cords are not to be placed across aisles, through doors, through holes in a wall, or in areas where the cord may be damaged or become a tripping hazard.

# 4.0 PORTABLE ELECTRICAL EQUIPMENT

- 4.1 Double insulated portable industrial type electrical tools meeting the requirements of the National Electrical Code are authorized for use (ground wire not required). Where such a system is employed, the equipment must be distinctly marked.
- 4.2 Portable electrical tools <u>not</u> provided with special insulating or grounding protection are not intended for use in damp, wet, or conductive locations (persons standing on the ground or on metal floors).
- 4.3 All portable electrical appliances and equipment where the non-current-carrying metal parts are exposed to contact by personnel shall be grounded by continuous conductor of adequate



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capacity from the device to a grounded receptacle. The Site Safety Officer shall resolve any question which arises as to whether or not a particular appliance should be grounded.

- 4.4 Grounding of receptacles shall be accomplished in one of two ways:
  - 4.4.1 A built-in ground wire of green color may be attached to the ground pole of the receptacle.
  - 4.4.2 The conduit system, if installed in an approved manner, may be relied upon for grounding of a receptacle serving single-phase appliances with ratings up to 230 volts.
- 4.5 At outside construction sites all single-phase 15 and 20 ampere receptacle outlets operating at 230 volts or less which are not a part of the permanent wiring of the building or structure must have ground-fault circuit interrupters for personnel protection.
- 4.6 The outlet box for portable extension cords for outdoor use shall be of weatherproof type maintained in good condition.

# 5.0 ELECTRICAL GUARDING

- 5.1 Suitable access and working space shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment.
- 5.2 The dimension of the working space in the direction of access to energized parts in switchboards, control panels, fused switches, circuit breakers, panel boards, motor controllers, and similar equipment which require examination, adjustment, servicing, or maintenance while energized, shall not be less than 36" in depth (30" for installations built prior to 1981) and the width being 30" or the width of the equipment, whichever is greater.
  - 5.2.1 The working space shall not be used for storage purposes. The "keep clear" area may be identified with suitable floor markings and/or posting of signs or decals on the equipment.
- 5.3 Energized parts of electrical equipment operating at 50 volts or more shall be guarded against accidental contact by the use of approved cabinets or enclosures.
  - 5.3.1 Entrance to rooms and other guarded locations containing exposed energized parts shall be marked with a conspicuous warning sign forbidding unqualified persons to enter.
  - 5.3.2 Temporary covers, warning signs, and/or barricades are to be used when it is necessary to remove covers of electrical panels during construction, major refurbishment, or for the purpose of providing temporary power to an area.



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All openings in boxes, enclosures, or fitting shall be effectively guarded or closed to afford protection substantially equivalent to that of the wall of the box, enclosure, or fitting.

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# 1.0 POLICY

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EARTH TECH policy is to protect employees against exposures to concentrations above the TLV. All employees must be familiar with and comply with the provisions of this procedure.

# 2.0 PURPOSE

This procedure outlines general precautions that are to be taken by personnel when handling solvents, compressed gases, and/or flammable liquids. Precautions and required protective equipment for specific chemicals or gases are included in Material Safety Data Sheets and Site Safety Plans.

# 3.0 DEFINITIONS

- 3.1 <u>Hydrocarbon solvents</u> are compounds consisting solely of hydrogen and carbon atoms. They are flammable in varying degrees and may leave a combustible residue or oily film.
- 3.2 <u>Alcohols</u> are hydrocarbon derivatives in which one or more hydrogen atoms have been replaced by a hydroxyl group (oxygen-hydrogen). They are flammable, water soluble, and leave no film.
- 3.3 <u>Ketones</u> are hydrocarbon derivatives containing oxygen atoms. They are flammable, water soluble, and dissolve some materials not affected by hydrocarbons or alcohols.
- 3.4 <u>Halogenated hydrocarbons</u> are organic compounds containing chlorine, fluorine, and/or other halogens. They are primarily non-flammable and leave no oily residue. Depending on their boiling point, they are used cold or in heated vapor degreasers. When exposed to flames, hot surfaces, or welding arcs, vapors of these materials decompose into highly toxic and corrosive vapors, such as phosgene or hydrogen chloride.
- 3.5 <u>Flammable solvents</u> are classified according to flash points and boiling points (see Section 6 of this procedure).
- 3.6 <u>TLV</u> is the abbreviation for "threshold limit value." Atmospheric contaminants are generally expressed as parts per million (ppm) denoting parts of the material in 1,000,000 parts of air. Threshold limit values are the ppm limits set by the American Conference of Governmental Industrial Hygienists which most employees may be continuously exposed during their 8-hour working days without any adverse effect on their health.
- 3." <u>Boiling point</u> is that temperature at which a liquid boils and is an indicator of the relative vapor concentrations present over liquids at any given temperature. (The higher the boiling point, the lower the vapor concentration.)
- 3.8 <u>Flash point</u> is that temperature at which sufficient flammable vapors are evolved from a liquid to enable ignition. (The lower the flash point, the more flammable the solvent.)



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- 3.9 <u>Flammability limits</u> denote the range, in percentage mixtures, of the material which will burn with air, or, if confined and ignited, will explode.
- 3.10 <u>Positive ventilation</u> is venting provided by ducting and fans or blowers as opposed to "comfort," or natural ventilation.
- 3.11 <u>Safety containers</u> are of welded seam construction with excess pressure relieving closure and wire mesh screens to prevent the propagation of flame into the container. Safety containers are painted red (some have one yellow stripe). The container must be plainly labeled as to contents.

# 4.0 SOLVENTS

- 4.1 All solvents remove protective oils from the skin on contact, increasing the possibility of dermatitis and infection. Some solvents may be absorbed through the skin to produce systemic effects.
  - 4.1.1 Repeated skin contact can cause a person to become sensitized to a given solvent.
- 4.2 All solvents have varying adverse effects if ingested. Hydrocarbon liquids produce respiratory complications if allowed to enter the lungs.
- 4.3 Vapor concentrations above a given solvent are highly difficult to predict, depending on the method of dispensing, agitation, temperature, air movement, and confinement. In any case, the concentration will be directly proportional to the area of the surface wetted under a given set of conditions.
- 4.4 Some of the solvent vapors may be detected by odor before the TLV is reached. However, this is not a reliable method for protection against overexposure, since some solvents paralyze the sense of smell.
- 4.5 Miscellaneous solvent supplies in work areas shall be reduced to the minimum amount necessary for daily operation.
- 4.6 Solvent containers for bench use shall be of smallest practical size and shall provide a method of dispensing without pouring (by wetting cloth, squeeze bottle, or plunger type safety container).
- 4.7 All wiping cloths used for solvents shall be placed in a closed container immediately after use.
- 4.8 Disposition of all solvent wastes must be by an environmentally approved method.
- 4.9 Spills shall be cleaned up immediately using respiratory protection. Clear the area of other persons as necessary.



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- 4.10 No solvent shall be used in a fashion to permit skin contact with the liquid. In most instances this means that gloves must be worn.
  - 4.10.1 Solvent-contaminated clothing must be removed at once.
- 4.11 All use of solvent not in positively vented equipment or in an outside area shall require the use of respiratory protection.
  - 4.11.1 When using solvents inside a pit or confined area, regardless of quantity, personnel must wear level B protection and comply with confined space entry procedures.
- 4.12 Containers of solvents shall be labeled with an appropriate warning label.
- 4.13 The following precautions must be observed when opening full drums of solvents or chemicals:
  - 4.13.1 When opening full drums, all personnel in the immediate area must wear chemical goggles or a face shield.
  - 4.13.2 When removing the bung, the barrel must be in an upright position and a proper bung wrench used. The bung is to be loosened one turn, internal drum pressure allowed to reach atmospheric pressure, and then the bung may be removed. Never place head or face above a bung when opening.

# 5.0 FLAMMABLE

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# 5.1 General Information

# 5.1.1 Definitions

- Class I Flammable: Includes those having a "flash point" below 100 ♥F.
- Class II Combustible Liquids: Includes those having a "flash point" at or above 100°F, but below 140°F.
- Class III Combustible Liquids: Includes those having a "flash point" above 140°F, but below 200°F.
- 5.1.2 Handling and storing of flammable liquids in closed or approved safety containers and avoiding exposure of the liquid surface to air are of fundamental importance.
- 5.1.3 Placards for flammable or combustible liquids are as follows:
  - "Flash point" of 20°F or below: "DANGER! EXTREMELY FLAMMABLE."



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"Flash point" from 20 F to 100 F: "WARNING! FLAMMABLE."

"Flash point" from 100 F to 200 F: "CAUTION! COMBUSTIBLE."

# 5.2 HANDLING AND DISPENSING

- 5.2.1 Drums in storage racks are to be minimum of 50 feet from the nearest structure.

  All drums are to be electrically grounded. Drip trays are to be provided under drum spigots.
- 5.2.2 A bond (metal-to-metal) is to be established between the container and drum prior to filling a container from the storage drum. Drums are to be equipped with an approved type safety faucet and flexible metal hose. A pressure-vacuum relief vent is required for drums of flammable liquids. Metal-to-metal contact may also be established by using a grounding strap.
- 5.2.3 Except in unusual cases as approved by the Regional Health and Safety Manager, the maximum amount of flammable solvent (used for cleaning purposes) at any work station is limited to one quart.
- 5.3 Maximum use must be made of fireproof metal cabinets to store flammable liquids inside any maintenance shop or area.
- Rags, kinwipes, etc., that are contaminated with flammable liquids are to be placed in a safety container equipped with a fusible link lid.
- 5.5 All containers of flammable liquids must be properly identified as to contents.
- 5.6 Spill containment is required for all drum (solvent) dispensing areas. The secondary containment dike will be designed for 110 percent of the aboveground storage tank (AST) volume with the ability for 24-hour holding time.
- 5.7 All manually handled flammable liquids shall be handled in approved safety containers. The exception is pint-sized squirt bottles.
  - 5.7.1 Where flammable solvents must be used in wash containers, such as for paint sprayer cleaning, the container must be provided with self-closing or fusible like closure.
- 5.8 Flammable liquid in portable containers in excess of the daily supply must be stored in approved flammable liquid storage cabinets maintained closed with the door latched each time after use.
- 5.9 Containers of flammable liquids shall be labeled with an appropriate warning label.



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- 5.10 "NO SMOKING" signs are to be posted in areas where flammable liquids are stored, dispensed, or used.
- Additional information and requirements for handling and storage of specific flammable liquids are included in the Material Safety Data Sheets or Site Safety Plans.

# 6.0 USE OF COMPRESSED AIR OR GASES

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- 6.1 Compressed air or other compressed gases in excess of 10 psi are not to be used to blow dirt, chips, or dust from clothing while it is being worn.
- 6.2 Compressed air or gases are not to be used to empty containers of liquids where the pressure can exceed the safe working pressure of the container.
- 6.3 The use of compressed air is to be controlled, and proper personal protective equipment or safeguards utilized, as to protect against the possibility of eye injury to the operator or other persons.
  - Compressed air used for cleaning (except clothing) is to be limited to 30 psi.
- 6.4 Compressed gases are not to be used to elevate or otherwise transfer any hazardous substance from one container to another unless the containers are designed to withstand the pressure with a safety factor of at least four.

# 7.0 COMPRESSED GASES (CYLINDERS)

- 7.1 Cylinders must never be dropped, struck, or permitted to strike each other violently. Cylinders may be moved by tilting and rolling them on their bottom edges.
- 7.2 Valve protection caps must always be kept on cylinders when they are being moved, stored, or until ready for use.
- 7.3 Cylinder valves are to be kept closed except when gas is being used or when connected to a permanent manifold. Valves of empty cylinders must be closed.
- 7.4 Cylinders must never be used as rollers or supports, or for any purpose other than carrying gas.
- 7.5 Cylinders of compressed gas shall be stored in areas where they are protected from external heat sources such as flame impingement, intense radiant heat, electric arc, or high temperature steam lines.
- 7.6 Cylinders are to be stored in an assigned area with full and empty cylinders separated. Stored fuel gases and oxygen cylinders are to be separated by 20 feet, or by a fire wall at least 5 feet high having a fire-resistance rating of at least one-half hour.



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- 7.7 Oxygen, nitrogen, helium, or freon cylinders may be stored or transported either in an upright or horizonal position. Acetylene cylinders must always be kept in an upright position. All horizontally placed cylinders are to be secured by chocks or ties to prevent rolling.
- 7.8 Cylinders are to be secured to a fixed object by chain or equivalent fastening device whenever they are placed in an upright position. The protective cap is not to be removed or the cylinder valve opened until the cylinder is secured.
- 7.9 Repair of leaks must never be attempted on a pressurized system. System pressure should be reduced to atmospheric pressure as rapidly as possible, and the supervisor notified immediately.
- 7.10 Compressed gas (in cylinders) must never be used to clean clothing or work surfaces.
- 7.11 Identification of the gas to be used must always be ensured before connecting cylinders for use. All cylinders are to be labeled as to contents in addition to proper color coding.
- 7.12 Compressed gas cylinders in portable service are to be conveyed by suitable trucks to which they are securely fastened. All gas cylinders in service must be securely held in substantial racks or secured to other rigid structures so that they will not fall or be knocked over.
- 7.13 Gas cylinders moved by hoist must be handled in suitable cradles or skip boxes. The use of slings must be designed for that purpose.
- 7.14 Cylinders must not be placed where they might form part of an electrical circuit.
- 7.15 Transfer of acetylene from one cylinder to another, or mixing of gases in a cylinder, is prohibited.
- 7.16 Oxygen cylinders are never to be stored near:
  - Highly combustible materials, especially oil and grease;
  - Reserve stocks of acetylene or other fuel gas cylinders; and/or
  - Any other substance likely to cause or accelerate fire.
- 7.17 Cylinders are not to be used unless they bear D.O.T. markings showing that they have been tested as required by D.O.T. regulations.
- 7.18 Compressed gas cylinders must be legibly marked for the purpose of identifying the gas content with either the chemical or the trade name of the gas. Such marking is to be by means of stenciling, stamping or labeling, and must not be readily removable. Whenever practical, the marking is to be located on the shoulder of the cylinder.

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7.19 Compressed oxygen is never to be used:

- as breathing air;
- to purge pipelines, tanks, or any confined area;
- to supply a head-pressure tank;
- in pneumatic tools;
- in oil preheating burners;
- to start internal combustion engines;
- for ventilation;
- for cleaning clothing; and/or
- in any other way as a substitute for compressed air.
- 7.20 Use of a cylinder's contents for purposes other than those intended by the supplier is prohibited.

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# 1.0 POLICY

Portable fire extinguishers shall be maintained in a state of readiness at all times. This applies to job sites, shops, and offices.

# 2.0 PURPOSE

This procedure describes requirements for the upkeep of portable fire extinguishers.

# 3.0 REQUIREMENTS

- 3.1 All fire extinguishers in offices in shops (for shop use) are to be mounted on walls.
- 3.2 The area adjacent to the mounted fire extinguishers is to be kept free of obstructions.
- 3.3 An inventory of all fire extinguishers is to be maintained by each office or shop. A checklist is included to ease this task.
- 3.4 Brief inspections are to be conducted monthly and documented on the checklist.
- 3.5 Any fire extinguisher not meeting the prescribed criteria shall be removed from service until the deficiencies are corrected.

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# PORTABLE FIRE EXTINGUISHER CHECKLIST

# OFFICE/SHOP LOCATION \_\_\_\_\_

INVENTORY			
Serial #	Location	Serial #	Location
2. Access is Fire extin Lock-pin Test tag is	guisher in assigned location*. not obstructed. guisher is fully charged. in place. s attached and current. Site dedicated extinguishers b		
NSPECTIONS	COMPLETED		
Month/Initials			
anuary	April	July	October
ebruary	May	August	November
March	June	September	December

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#### 1.0 POLICY

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EARTH TECH will engage in investigations, engineering, sampling and abatement activities related to asbestos containing materials (ACMs), only when employees are adequately trained and all activities comply with applicable regulatory requirements.

#### 2.0 PURPOSE

This procedure describes basic policy for ACM activities.

#### 3.0 REQUIREMENTS

- 3.1 No work of any kind is to be conducted involving ACMs unless the employee has been trained in compliance with OSHA regulations (29 CFR 1926.58 and 29 CFR 1910.1001). Additionally, many types of asbestos- related work require training under the Asbestos Hazard Emergency Response Act (AHERA). As a general rule AHERA training shall be obtained. An 8-hour annual refresher class is also required.
- 3.2 Any employee conducting supervisory work on an ACM project will comply with the same requirements as the personnel conducting the work. This includes training, medical surveillance and protective equipment.
- 3.3 Several states have registration or certification requirements. Necessary local documentation will be acquired prior to initiating work.
- 3.4 A Site Safety Plan will be prepared for all ACM projects.
- 3.5 All other applicable health and safety procedures shall be enforced on ACM projects.

#### 4.0 MEDICAL REQUIREMENTS

Asbestos related work requires slightly different medical surveillance procedures than for hazardous waste activities. These requirements are as follows:

- 4. A medical surveillance program is required for employees who are:
  - Exposed to asbestos at or above the action level (0.1 fiber > 5 micron/cc) for 30 or more days per year; and/or
  - Required to wear negative pressure respirators to protect against asbestos
- 4.2 Medical exams shall be conducted:
  - Prior to assignment to an area requiring negative pressure respirators;
  - Prior to assignment to an area where the action level may be exceeded;



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- At least annually thereafter;
- More frequently, if the examining physician deems it advisable for medical reasons; and
- Within 30 days before or after the date of termination of employment for any employee who has been exposed at or above the action level.

#### 4.3 EARTH TECH is responsible for providing the physician:

- A copy of the OSHA asbestos standards (29 CFR 1910, 1001 and 29 CFR 1926.58) and Appendices D, E and I;
- The employee's representative or anticipated exposure level;
- Site health and safety plan;
- A description of personal protective equipment to be used; and
- Information from previous examinations which may not be readily available to the physician.

#### 4.4 The medical exam shall include:

- A medical and work history;
- A complete physical exam with emphasis on the respiratory system, cardiovascular system and respiratory tract;
- Completion of the standardized-questionnaire in Appendix D of the OSHA standard;
- Pulmonary function test;
- Chest X-ray or initial exam. Periodic chest X-rays will be administered as deemed necessary by the physician or according to the following chart as a minimum:

Years Since Employee First Exposed	Age of Employee		
	15 - 35	35 - 45	45 plus
0 - 10	every 5 years	every 5 years	every 5 years
10 plus	every 5 years	every 2 years	every year

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- 4.5 EARTH TECH shall obtain and furnish the employee with a written copy of the physician's written opinion containing:
  - Results of physical exam and tests;
  - Physician's opinion as to any detected medical conditions which would place the employee at increased risk of health impairment;
  - Physician's recommended limitations upon the employee's assigned work or use of personal protective equipment; and
  - A statement that the employee has been informed by the physician of the results of the medical exam and any medical conditions resulting from asbestos exposure which may require further explanation or treatment.

#### 5.0 RESPIRATORY PROTECTION

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The OSHA standard for asbestos (29 CFR 1926.58 n) contains specific requirements for respirator usage in addition to the EARTH TECH basic program.

- 5.1 Respirator cartridges will, at a minimum, be changed on a daily basis. Additionally, cartridges will be changed whenever there is an increase in breathing resistance.
- 5.2 Employees may choose a powered air purifying respirator whenever a negative pressure respirator is required.
- 5.3 Respirators will be chosen based on the airborne levels measured or anticipated according to the following table:

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Not in excess of 2 f/cc (10 X PEL):

1. Half-mask air-purifying respirator equipped with high-efficiency filters.

Not in excess of 10 f/cc (50 X PEL):

1. Full facepiece air-purifying respirator equipped with high-efficiency filters.

Not in excess of 20 f/cc (100 X PEL):

- 1. Any powered air-purifying respirator equipped with high-efficiency filters; and
- 2. Any supplied-air respirator operated in continuous flow mode.

Not in excess of 200 f/cc (1000 X PEL):

1. Full facepiece supplied-air respirator operated in positive pressure mode.

Greater than 200 f/cc (> 1,000 X PEL) or unknown concentration

- 1. Full facepiece supplied air respirator operated in pressure demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus.
- 5.4 Employees will be allowed to leave work areas to wash their faces whenever necessary to prevent skin irritation.
- Fit testing will be repeated every 6 months for negative pressure respirators. Fit testing will use either isoamyl acetate or irritant smoke per Appendix C to 29 CFR 1926.58.

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#### 1.0 POLICY

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EARTH TECH and its contractors will provide a safe work place for construction/demolition activities in compliance with this procedure, this manual, and all applicable regulations.

#### 2.0 PURPOSE

This procedure provides fundamental safety rules specifically addressing construction/demolition projects.

#### 3.0 JOB SAFETY PLANNING

- In preparing the estimate, a realistic sum of money for safety requirements in accordance with conditions, company safety policies, Federal and state safety and health regulations, owner, and other regulatory agency specifications is to be included.
- 3.2 Hold a pre-job planning meeting soon after contract award to discuss:
  - 3.2.1 Owner, company, and regulatory agency requirements.
  - 3.2.2 Hazards and control measures involving EARTH TECH or Contractor employees, equipment and materials. Refer to the Federal and state safety and health regulations for specific requirements to include the following topics:
    - Personal protective equipment required;
    - Lighting for night operations;
    - Fire prevention, fire fighting equipment;
    - Ladders, scaffolds, nets, overhead protection and other temporary structure safety requirements;
    - First aid and medical requirements;
    - Traffic patterns, haul road layout, designated parking areas;
    - Sanitary requirements, drinking water; and
    - Security.
  - 3.2.3 Hazards and control measures involving members of the public and/or their property. Address the following:
    - Public vehicular traffic exposure need for signs, barricades, flashers, flagmen, detours, traffic lights;
    - Public pedestrian and children need for temporary walkways, overhead protection, watchmen, securing equipment, fencing and other methods of protection and denial of access;



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- Railroad protection required, notification to railroads of our operation, securing train schedules, flagmen, signs, warning signals, reduced speed, special insurance;
- <u>Utilities</u> underground and overhead-locating and marking, notification of schedules, special insurance; and
- Use of flashing yellow lights on equipment working in and around traffic.
- 3.2.4 Prepare a site safety plan to be used as a guide in ordering safety documents and in developing the safety program at the start of the job.
- 3.2.5 Order safety equipment to arrive ahead of need. Spell out safety features desired on new equipment being purchased. Check rented equipment before making agreements to be sure equipment has essential safety features.
- 3.3 Review Site Safety Plan:
  - 3.3.1 Status of safety equipment ordered.
  - 3.3.2 Any changed conditions and effect on safety requirements.
  - 3.3.3 Notifications to railroads, utility companies.
  - 3.3.4 Contacts with insurance carrier to obtain their recommendations.
- 3.4 Safety inspection of equipment: correct deficiencies before equipment goes to work. Required safety features must be installed on rented units.
- 3.5 Review safety program with subcontractors to familiarize them with requirements for safety. Give them a copy of the written program.

#### 4.0 ORIENTATION OF JOB SITE PERSONNEL

- 4.1 Each employee is to be instructed in the recognition and avoidance of unsafe conditions and the regulations applicable to his/her work environment to control or eliminate hazards or exposures to illness and injury.
- 4.2 The following paragraphs describe the methods to be used and records to be maintained in the indoctrination session and tailgate meetings.



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- 4.2.1 New employees working in non-office environments shall be provided indoctrination as to the company safety program, job site rules and safety rules pertaining to the job assignments prior to beginning work. This orientation shall be conducted by personnel knowledgeable in the requirements.
- 4.2.2 Upon completion of the review of the site safety plan, workers will sign the acknowledgement.

#### 5.0 PROTECTION OF THE PUBLIC

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All necessary precautions shall be taken to prevent injury to the public or damage to property of others. Precautions to be taken shall include, but are not limited to, the following:

- Work shall not be performed in any area occupied by the public unless specifically permitted by the contract or in writing by the construction manager.
- 5.2 When it is necessary to maintain public use of work areas involving sidewalks, entrances to buildings, lobbies, corridors, aisles, stairways and vehicular roadways, trade contractors shall protect the public with appropriate guardrails, barricades, temporary fences, overhead protection, temporary partitions, shields and adequate visibility.
- 5.3 Sidewalks, entrances to buildings, lobbies, corridors, aisles, doors or exits shall be kept clear of obstructions to permit safe entrance and exit of the public at all times.
- 5.4 Appropriate warnings and instructional safety signs shall be conspicuously posted where necessary. In addition, a signalman shall control the movement of motorized equipment in areas where the public might be endangered.
- 5.5 Sidewalks, sheds, canopies, catch platforms and appropriate fences shall be provided when it is necessary to maintain public pedestrian traffic adjacent to the erection, demolition or structural alternation of outside walls on any structure.
- A temporary fence shall be provided around the perimeter of above ground operation adjacent to public areas. Perimeter fences shall be at least 6 feet high.

They may be constructed of wood or metal frame and sheathing, wire mesh, or a combination of both. When the fence is adjacent to a sidewalk near a street intersection, at least the upper section of fence shall be open wire mesh from a point not over 4 feet above the sidewalk and extending at least 25 feet in both directions from the corner of the fence or as otherwise required by local conditions.

Guardrails shall be provided on both sides of vehicular and pedestrian bridges, ramps, runways, and platforms. Pedestrian walkways elevated above adjoining surfaces, or walkways within 6 feet of the top of excavated slopes or vertical banks shall be protected with guardrails. Guardrails shall be made of rigid materials capable of withstanding a force

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of at least 200 pounds applied in any direction at any point in their structure. Their height shall be approximately 42 inches. Top rails and posts may be 2 inches by 4 inches dressed wood or the equivalent. Intermediate horizontal rails at mid-height and toe boards at platform level may be 1 inch by 6 inch wood or the equivalent. Posts shall not be more than 8 feet apart.

- 5.7 Barricades, where required, shall be secured against accidental displacement and shall be maintained in place except where temporary removal is necessary to perform the work. While a barricade is temporarily removed for the purpose of work, a watchman shall be placed at all openings.
- 5.8 Temporary sidewalks shall be provided when a permanent sidewalk is obstructed by the trade contractor's operation. They shall be installed in accordance with the requirements listed above.
- 5.9 Warning lights shall be maintained from dusk to sunrise around excavations, barricades or obstructions in plant areas. Illumination shall be provided from dusk to sunrise for all temporary walkways in both plant and construction areas.

#### 6.0 HOUSEKEEPING

A basic concept in any effective prevention endeavor is good housekeeping. No one item has a greater impact on the overall success of a safety program for a construction project.

The importance of good housekeeping is such that it must be planned for from the beginning to the final clean-up. The degree of attention given to housekeeping will normally be reflected in the accident record, as well as in construction efficiency.

- 6.1 During the course of construction, work areas, passageways, and stairs in and around buildings and structures shall be kept clear of debris. Construction materials shall be stored in an orderly manner. Storage areas and walkways on the site shall be maintained free from dangerous depressions, obstructions, and debris.
- 6.2 The essential elements of good housekeeping are:
  - Orderly placement of materials, tools, and equipment;
  - Placing receptacles at appropriate locations for the disposal of miscellaneous rubbish;
  - Prompt removal and disposal of trash and waste materials; and
  - Locating air and water lines, welding leads, and burning hose in positions that eliminate tripping hazards.

#### 7.0 SCAFFOLDING



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- 7.1 The footings and anchorage for scaffolds shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement.
- 7.2 A safe means of access to and egress from the work level must be provided. Ladders used for access/egress must be secured at top and bottom. Ladder frame scaffolds must not be offset or used with other scaffold frames.
- 7.3 No scaffold shall be erected, moved, dismantled, or altered, except under the supervision of competent persons.
- 7.4 Scaffolds and their components shall be capable of supporting without failure at least four times their maximum intended load.
- 7.5 Guardrails and toeboards shall be installed on all open sides and ends of platforms more than 10 feet above the ground or floor.

#### 8.0 WORK AREA PROTECTION

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- 8.1 Any open area 4 or more feet above adjacent surfaces shall be protected by a substantial guardrail able to resist 200 lbs. of horizontal force, a steel perimeter cable, or a warning system such as flagging or caution tape installed a minimum of 6 feet from the surface's exposed edge.
- 8.2 Floor openings through which personnel or material can pass should be protected by a cover or barricade, substantial enough to withstand any anticipated load. Covers shall be anchored and identified to prevent accidental removal or displacement.
- 8.3 Warning signs, barricades, and flagging are to be used to warn personnel of potential or hidden hazards or advise of intermittent activities which might endanger outside personnel. They are not to be used in lieu of more effective protection.
- 8.4 Adequate ventilation or localized exhaust may be required to satisfy the work environment requirement of OSHA (1926.55, 57). Such equipment as is necessary shall be furnished by the trade contractor unless other arrangements have been made in writing.
- 8.5 If temporary illumination furnished by others is inadequate, the trade contractor is responsible to notify the construction manager of these deficiencies.
- 8.6 Protection of vertical rebar. Employees shall not be permitted to work above vertically protruding reinforcing steel unless it has been covered or protected to eliminate the hazard of persons falling on it and being impaled.

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#### 1.0 POLICY

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Concern for safe operation of vehicles cannot be overemphasized. Vehicle operations represent perhaps one of the greatest potentials for serious loss because the public is involved and court awards to injured parties can be staggering. It is essential, therefore, that EARTH TECH have an effective, well-organized Vehicle Safety Plan.

#### 2.0 PURPOSE

This procedure establishes requirements for safe operation of vehicles and equipment.

#### 3.0 REQUIREMENT - VEHICLES

- 3.1 All vehicles operated in interstate transportation are subject to the Interstate Commerce Commission and Bureau of Motor Carrier Safety Regulations. Measures shall be established to assure that drivers and equipment meet those regulatory requirements.
- 3.2 The EARTH TECH Shop Manager is responsible for the following:
  - 3.2.1 Providing interface with the Corporate Health and Safety Officer.
  - 3.2.2 Assuring that all vehicle accident reports from all jobs are processed and the required number of copies submitted to local, state, and Federal agencies, to the Corporate Health and Safety Officer, and to the insurance carrier.
  - 3.2.3 Assuring that Corporate Health and Safety Officer is notified by telephone of accidents that involve fatalities or multiple serious injuries.
  - 3.2.4 Selection of only highly qualified drivers.
  - 3.2.5 Establishing and conducting a training program, if required.
  - 3.2.6 Investigation of all accidents to establish the when, where, and why the accident occurred and for assuring action to prevent recurrence.
- 3.3 All accidents shall be documented and investigated by supervisory personnel. The investigation should be of sufficient depth to determine the cause and action required to prevent recurrence. Copies of all motor vehicle accident reports shall be forwarded to health and safety and the insurance carrier.

#### 4.0 REQUIREMENTS - EQUIPMENT

4.1 General - The following safety rules apply to all types of operators.



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- 4.1.1 <u>Air Hose and Couplings</u> Periodically check air compressor hoses for worn or damaged parts. Do not crimp air hose to disconnect couplings; shut off air at the valve.
- 4.1.2 <u>Backing Up</u> Never start or back up equipment or vehicles until you are sure the way is clear. If necessary, have another person guide you safely. Back up alarms, when required, must be working and audible over the surrounding noise.
- 4.1.3 <u>Boots and Shoes</u> Wear sturdy work shoes or boots. Hobnailed boots or shoes should not be worn due to the slipping and snagging hazard they present.
- 4.1.4 <u>Cranking</u> When crank starting a motor, place thumbs next to the index fingers and not around the crank handle. Pull up on the crank never push down. This method avoids injury in case of engine kickback.
- 4.1.5 <u>Ear Protection</u> Ear plugs or other approved ear protection shall be worn when necessary.
- 4.1.6 <u>Emergency Vehicles</u> Give ambulances, fire fighting equipment and other vehicles the right-of-way during emergencies and lend assistance if required.
- 4.1.7 <u>Fueling and Repair</u> No fueling or repair shall be made to equipment while it is in operation. The motor shall be turned off and the bucket, blade, gate or boom shall be lowered to the ground or blocks.
- 4.1.8 <u>Gasoline</u> Gasoline and other combustible liquids shall not be carried in or on vehicles other than in permanent gas tanks or in approved safety cans.
- 4.1.9 Gloves Heavy gloves should be worn when handling wire rope and other rough materials.
- 4.1.10 <u>Housekeeping</u> Operators should keep deck plates, steps, rung and hand rails on equipment free of grease, oil, ice, and mud. The inside of the cabs shall also be kept clean and free of flammable items.
- 4.1.11 <u>Inspections</u> Inspect the unit to which you are assigned to make sure it is in safe operating condition. These inspections shall be made at least at the start of each shift and defects or discrepancies shall be reported to the supervisor immediately. Equipment forms are available to record this data (EQ Form 505). Equipment and vehicles shall not be used until defects or discrepancies are repaired unless they do not affect the safe operation of the equipment or vehicle.
- 4.1.12 <u>Jumping</u> Jumping on or off equipment is prohibited. When climbing on or off equipment or vehicles, face the unit and use secure hand and foot holds to prevent slips and falls. Always look where you are stepping.



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- 4.1.13 Know Your Equipment or Vehicle It is your responsibility to be thoroughly familiar with all feature plates and manuals and, if you are in doubt as to correct operating techniques or safety features, ask your supervisor at once.
- 4.1.14 <u>Laws and Regulations</u> Learn and obey all local, state, and Federal laws and the client's stipulations.
- 4.1.15 <u>Moving Equipment</u> Do not attempt to get off or on any equipment or vehicle while it is in motion.
- 4.1.16 Overloading Avoid overloading vehicle beds and equipment buckets and beds. Excessive material can damage the unit and falling material can cause serious injury.
- 4.1.17 <u>Parking</u> Equipment and vehicles shall be parked off roads and highways whenever possible. When it is not possible, the unit shall be marked by red lights or flares at night and red flags during the day. Wheels should be blocked.
- 4.1.18 Passing Do not pass when visibility is restricted for any reason.
- 4.1.19 <u>Pedestrians</u> Be constantly alert for pedestrians. Remember they have the right-of-way.
- 4.1.20 <u>Power Lines</u> When operating high trucks, cranes, shovels or other units, always use caution around power lines and maintain a safe clearance of 10 feet or more depending upon the voltage.
- 4.1.21 <u>Qualifications</u> Only fully qualified and authorized personnel shall operate construction equipment or vehicles.
- 4.1.22 <u>Riders</u> Only authorized persons will be permitted to ride in equipment or vehicles.
- 4.1.23 <u>Seat Belts</u> If unit is equipped with seat belts, operator and passengers must keep seat belts fastened at all times during operations.
- 4.1.24 Equipment and Vehicle Security -
  - All units shall be secured so that they cannot be started or moved by any unauthorized person during off-work hours.
  - All mobile units shall be secured in some way whereby they cannot move freely after they are parked.
  - They key should be removed after securing equipment or vehicle and turned over to an authorized supervisor.

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- 4.1.25 <u>Shoulders and Ditches</u> Do not operate too closely to the edge of shoulders, cuts, fills, or ditches.
- 4.1.26 <u>Slow Down</u> Slow down and use caution at blind intersections and crossings when visibility is limited or when passing work crews.
- 4.1.27 <u>Smoking</u> Do not smoke during refueling or servicing operations. Do not throw lighted material from vehicles or equipment.
- 4.1.28 Speeding Speeding is dangerous and is strictly prohibited.
- 4.1.29 Thumbs Up Keep thumbs up when driving. Do not grasp the steering wheel with thumbs inside the spokes.
- 4.1.30 <u>Visibility</u> Make sure all windshields, side and rear windows, mirrors and lights are clean before moving the unit.
- 4.1.31 <u>Warning Signs and Traffic Signals</u> Be alert for and strictly obey all directional and warning signs and signals.
- 4.2 Trucks, Pickups, and Other Vehicle Operators
  - 4.2.1 Blind Curves Slow down and sound horn when approaching a blind curve.
  - 4.2.2 <u>Driver's License</u> Always carry your driver's license with you when operating a vehicle and make sure it is current.
  - 4.2.3 <u>Heavy Rock and Other Material</u> Do not remain in an open cab truck while it is being loaded with heavy rock or other material presenting a falling hazard. Dismount and move to a safe distance and observe the loading.
  - 4.2.4 <u>Hooks</u> Hooks or calipers on the "A" frame of trucks should be securely fastened to prevent swinging when not in use. Stand clear of the "A" frame.
  - 4.2.5 <u>Loading</u> Materials and equipment shall be properly loaded and secured to prevent shifting of loads or loss of material during transit.
  - 4.2.6 <u>Long Hauls</u> On long hauls, binders should be checked periodically (at least during each rest or service stop) to make sure they are still secure and tight.
  - 4.2.7 Overhanging and Oversize Loads When it is necessary to transport overhanging or oversize loads, the appropriate signs, red flags and red lights will be used. When necessary, use flag cars.
  - 4.2.8 <u>Safety Chains</u> Safety chains of sufficient size and strength shall be installed on all trailers being towed.



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- 4.2.9 <u>Safety Hooks</u> Use safety hooks on all winch truck cables.
- 4.2.10 <u>School Buses</u> Obey school bus laws. Slow down and prepare to stop when approaching school, buses, children on foot or on bicycles.
- 4.2.11 <u>Side Roads and Railroad Tracks</u> Stop and look both ways before crossing railroad tracks or before driving onto a highway from a side road.
- 4.2.12 <u>Stopping</u> Do not stop vehicles in the middle of the road to talk to occupants in another vehicle. Always pull to the side or off the road to maintain a clear, safe road.
- 4.2.13 <u>Turn Signals</u> Always use turn signals, emergency and other signals as appropriate when turning, stopping, passing, or performing other vehicle operations.
- 4.2.14 <u>Vehicle Maintenance</u> It is the driver's responsibility to see that his or her vehicle is in good mechanical condition before and during operation. Special emphasis should be placed on ensuring the brakes, lights, horn, windshield wipers, tires and steering assembly are in good order. Defects must be reported and corrected immediately.

#### 4.3 Building Hoist Operators

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- 4.3.1 <u>Communications</u> Learn and abide by the approved signal system. Have proper communications with all floors as necessary and the ground before operating hoist.
- 4.3.2 <u>Hoist Platform</u> Never move the hoist platform unless you understand the proper signal and you are sure the way is clear.
- 4.3.3 Riders Do not haul riders on material hoist and do not haul riders and material together on a personnel hoist.

#### 4.4 Crane, Shovel and Dragline Operators

- 4.4.1 <u>Boom Deflection</u> Keep the boom free of all objects and structures. If boom is allowed to rest against structures, it can cause deflection under load.
- 4.4.2 <u>Capacity</u> Do not make lifts exceeding the carrying capacity of crane cables, ropes, and slings.
- 4.4.3 <u>Control</u> Make sure you have the load under control when raising and lowering. Use slow, uniform and steady movements for safe, efficient operation.
- 4.4.4 <u>Drums</u> Do not lower blocks below the point where less than two full wraps of cable remain on the drum.



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- 4.4.5 <u>Fire Extinguishers</u> Each cab-type crane. shovel, or dragline will be provided with a company approved fire extinguisher. Operators are responsible to check these extinguishers daily and to obtain a replacement if defective or after being used.
- 4.4.6 <u>Flammable Liquids</u> Do not keep gasoline or flammable solvents in crane, shovel, or dragline cabs.
- 4.4.7 <u>Hand Signals</u> Only the standard hand signals recommended by the International Union of Operating Engineers will be used. These should be posted on the equipment.
- 4.4.8 <u>Hoisting</u> Start hoisting load slowly and smoothly. Avoid jerking the load as this may throw the crane or shovel off balance. Follow the same procedure when stopping the load.
- 4.4.9 <u>Housekeeping</u> Keep all deck plates, ladders and walkways on machine clear of oil and grease. Keep walkways and passageways clear of tools and materials.
- 4.4.10 <u>Inclement Weather</u> Check brakes and hoisting equipment in wet or icy weather before raising a load. Wet frictions frequently cause load slippage. Loads should not be lifted during strong or gusty winds.
- 4.4.11 <u>Level Surface</u> Keep the rig on a firm, level surface. When the ground is uneven, muddy or soft, mats or timbers will be used to level the rig and to provide a firm foundation from which to work.

#### 4.4.12 Loads -

- Do not leave a load hanging or a bucket or clam full of material during lunch or after quitting.
- Loads should not be held for extensive lengths of time by the brake. "Dog" it off where possible or secure by blocking. Operators must not leave the controls while load is suspended.
- Make certain the unit and its rigging are capable of handling the intended load at the anticipated radius. Check capacity charts.
- Raise heavy loads slightly off the ground level and hold long enough to test the rig.
- Be sure that the slings are attached to the load properly and that all loose material has been secured or removed before starting to lift.



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4.4.13 <u>Maintenance</u> - It is the operator's responsibility to see that his or her equipment is in safe working condition prior to and during each shift. Special attention should be paid to brakes, sheaves, cables, hooks, cramps, boom, boom stops, and outriggers. Defects which affect the safe operation of the equipment must be corrected prior to operating the equipment.

#### 4.4.14 Operating Boom -

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- Use caution when swinging booms. Be constantly alert for other workers in the vicinity of your equipment.
- Place the load boom directly over the load before starting the hoist to avoid swinging the load.
- 4.4.15 Oilers and Mechanics Watch out for the oiler or mechanics. They may be green and your instructions or advice may be needed to ensure for their safety.
- 4.4.16 <u>Outriggers</u> Use outriggers according to the manufacturer's operating recommendation and at all times when the stability of the crane is unknown or questionable.
- 4.4.17 Overhang Use extreme caution when working close to overhanging material and make sure there is no danger of cave-ins.
- 4.4.18 Power Lines State and other regulations forbid the operation of booms or other parts of a crane or shovel within specified distances from electric power lines. Know the standard before operating crane or shovel. At no time shall boom or cables be worked within 10 feet of energized power line. Warning decals should be mounted in the cab.
- 4.4.19 <u>Riding</u> Workers shall not be permitted to ride headache balls, buckets, hooks, or skip boxes except in emergencies or for the purpose of inspection and maintenance and then only under the specific direction of the supervisor.
- 4.4.20 <u>Signalmen</u> Take signals only from the one person supervising the lift or designated as signalman. Obey a stop signal at all times regardless of who gives it.
- 4.4.21 <u>Suspended Bucket and Boom</u> Always leave bucket and/or boom in a safe position or lower to a spoil pile. Always place it in a position to avoid a hazard in the work area.
- 4.4.22 <u>Trenches</u> Avoid placing rigs in close proximity to trenches or embankments where the ground is likely to give way or shift.
- 4.4.23 <u>Wire Lines</u> Inspect all cables periodically for wear or fraying. When spooling or reeling cable, never guide moving cable with the hands.



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#### 4.5 Front End Loader Operators

- 4.5.1 <u>Brakes</u> All loaders will have operable brakes. Faulty brakes shall be reported to your supervisor at once.
- 4.5.2 <u>Loader Bucket</u> Loader bucket shall be lowered to the ground when not in use.
- 4.5.3 <u>Loading</u> When loading trucks, know what is on the other side of the truck.
- 4.5.4 <u>Raised Bucket</u> When traveling with bucket raised, bucket should not be above the top of radiator of the machine where it would obstruct the operator's view.
- 4.6 Scrapers, Dozers. Tractors, and Other Heavy Equipment Operators -
  - 4.6.1 <u>Clothing</u> Operators must be careful not to wear loose or torn clothing which can get caught in tracks or other moving parts of the machinery.
  - 4.6.2 <u>Coasting</u> Never coast with any type of equipment. Always keep the power on and the equipment in gear.
  - 4.6.3 <u>Dozer Blade</u> Do not use the dozer blade as a brake when coming down a slope or hill, except in case of brake failure.
  - 4.6.4 <u>Hydraulic or Winch Driven Equipment</u> Dozer and grader blades, ripper teeth, scraper gates and equipment must always be lowered to the ground or blocks when equipment stops or is secured for the shift.
  - 4.6.5 <u>Inclined Surface</u> Never leave equipment on an inclined surface or on loose material with the motor idling as the vibration may put the machine in motion.
  - 4.6.6 <u>Riders</u> Operators will not allow riders to ride draw bar, clutch housing, boom or boom winch. Only specifically authorized persons will be allowed to ride jump seats, if equipment is so equipped.
  - 4.6.7 <u>Running Wire</u> Inspect all cables periodically for wear. When spooling or reeling cable, never guide moving cable with the hands.
  - 4.6.8 <u>Safety Equipment</u> Check and ensure all guards, canopies, safety bars and other safety equipment are installed and in good order prior to operating equipment.
  - 4.6.9 <u>Traveling</u> When moving equipment, keep dozer blade and scraper bowl close to the ground but high enough to avoid rocks and other obstacles.
  - 4.6.10 <u>Winches</u> Inspect winch brakes, cables and pins periodically. When indicated, have repairs made before using.

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# What To Do In the Event of A Crash

Any personal injury?

Yes

Call Police. Get investigating officer's badge number and station address.

Yes

Call Police. Get investigating officer's badge number and station address.

Assist the injured. Call for medical aid. Minimize further hazard.

Exchange insurance information. Complete the diagram statement of accident. Contact local Sedgwick office with details.

Any damage to company vehicle?\*\*

Yes

No

Contact Sedgwick with details.

Contact your immediate supervisor

\* Call Sedgwick Claims Management Services's 24-hour claims service: 1-877-261-8926

For proper identification when you call, please have your automobile number or serial number ready. Remember: carry this form, your accident report form, and auto ID car in your glove compartment at all times.

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ACCIDENT	Description of	Accident								
INFORMATION	ļ									
	Intersection/Hi	ghway of Accide	nt with Clos	est Cross Street	Æxit. If Exa	ct locatio	n is known	provide address, ci	ity, state, zip.	
	Were Authoriti	es Yes If so,	What Depar		y Citations ied?	Yes No	Who Rec	eived Citation?		
	Your Name	NO		Your Address,						
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	Home Telepho	ne Social S	ecurity #	Date of Bi	rth	Driv	ers Licens	e # / State Issued / I	Expiration Date	
INSURED	( ) -		<del></del>						/	
DRIVER	Vehicle Year	Vehicle Make	V	ehicle Model		VINN	umber		Fleet Unit Num	ber
AND	License Plate	State of	License Plat	te What wa	s Vehicle Be	ing Used	For?	Business	Pleasure	
VEHICLE INFORMATION					icle Used W	ith Permi	ssion?	Yes	No	
INFORMATION	What are the D	amaged Areas of	Vehicle?			Estima	ted Dollar	Amount of Damage	<b>:</b>	
	Where Can Ve	hicle Be Seen?				ls.	Vehicle Dr	iveable?	Was Vehicl	e Towed?
	· incre can voi	more Be seen.				"	Yes	No	Yes	No
	Vehicle Year	Vehicle Make	V	ehicle Model		VINN	umber		Is Vehicle Drive	
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0.1	License Plate	State of Lie	cense   N	ame of Insurance	e Carrier		ľ	Policy Number		
Other DRIVER	Name of Owner of Vehicle Address, City, State, Zip of Vehicle Owner									
AND	I' T.I.I.	# 1/1:1:0			T 33/1		11.1.1			
VEHICLE		ne # - Vehicle Ov ne # - Vehicle Ov			wn	ere can v	ehicle be s	een?		
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	Work Telephor	ne # - Vehicle Dri	ver ( )	-				/	1	
	What are the D	amaged Areas of	Vehicle?				hicle Towe	d? Estimated Do	ollar Amount of D	amage
						Yes	No			
:	Name of In	jured Persons	<del> </del>	Address	, City, State	Zip		<del> </del>	Telephone #	
	2	<del></del>	<del></del>					<del> </del>		
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INJURED	4	<del></del>						<del> </del>		
PERSON(S)	Age of Injured	Nature	and Extent	of Injuries		Transpor Where Ta		What Ve	hicle Was Injured	In?
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INSTRUCTIONS				1555 West I						
West Palm Beach, FL 33401-2364										

## Vehicle Accident Investigation



Seek Medical assistance for injury immediately.



Do not admit responsibility for the accident.



Notify Local law enforcement authorities if injuries are involved or if non-Tyco property is damaged



Immediately call Sedgwick CMS at 1-800-261-TYCO to report the accident. (You will be asked to provide the information on the enclosed form.



Complete and submit the enclosed form then mail it to:
Sedgwick CMS
P.O. Box 4709
West Palm Beach, FL 33402



Notify Tyco Risk Management at (561) 988-7200 if the accident involves a fatality, heart attack, loss of a body part, brain injury, spinal cord injury or burns over 20 percent or more of the body.

### Please Complete a Diagram of The Accident Scene Please indicate your direction of travel and the direction of travel of any other vehicles with an arrow -Please Indicate North, South Please use the following symbols on your diagram: East and West Below Yield Sign Your Vehicle Pedestrian Other Vehicle Point of Impact X Stop Light Stop Sign Bicycle/Motorcycle Railroad

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EMERGENCY RESPONSE	DATE PUBLISHED:	April 23, 1991
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#### 1.0 POLICY

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Personnel assigned to emergency response operations will be appropriately trained. Equipment and supplies dedicated to emergency response will not be utilized for day-to-day operations.

#### 2.0 PURPOSE

This procedure describes minimum requirements for emergency response operations involving hazardous materials.

#### 3.0 GENERAL REQUIREMENTS

- 3.1 Supplies and equipment dedicated to emergency response will not be used in day-to-day operations.
  - 3.1.1 Pollution control trucks will have an inventory of required supplies.
  - 3.1.2 The pollution control truck inventory will be checked after every use and at least monthly. Items not present are to be restocked immediately.
  - 3.1.3 A copy of the inventory and latest inspection is to be kept with the pollution control truck at all times.
  - 3.1.4 Analytical equipment (e.g., HazCat kits and Draëger tubes) will be inventoried monthly or after each use. Deficient or out of date items will be restocked immediately.
- 3.2 OSHA regulations require that the senior officer responding to an incident involving a hazardous substance or waste will establish an Incident Command System (ICS). All emergency responders and their communications will be coordinated and controlled through the individual in charge of the ICS.
- 3.3 All emergency response activities will comply with all procedures in this manual.
- 3.4 A Site Safety Officer will be assigned at all emergency response sites.

#### 4.0 SITE SAFETY PLAN

All emergency response sites will have a site safety plan approved by the Corporate Health and Safety Officer or his/her designee. The site safety plan will consist of the following elements:

4.1 All hazardous substances or conditions will be identified to the extent possible.



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- 4.2 Appropriate personal protective equipment is to be worn on site and be so specified in the plan:
  - Protective clothing;
  - Gloves:
  - Hard hat;
  - Eye protection;
  - Respiratory protection; and
  - Foot protection.
  - 4.2.1 An SCBA in the pressure demand mode is to be worn during emergency operations until air monitoring justifies a lower level of protection.
- 4.3 The site supervisor will limit the number of emergency response personnel at the emergency site to those who are actively performing emergency operations. However, operations in hazardous areas will be performed using the buddy system in groups of two or more. Back-up personnel will be standing by with equipment ready to provide assistance or rescue. Qualified basic life support personnel, as a minimum, will also be standing by with medical equipment and transports capability.
- 4.4 The site safety officer will have the authority to suspend or terminate activities deemed to be unsafe or involve an imminent danger condition.
- 4.5 Work zones will be established per Health and Safety Procedure No. 15.
- 4.6 Decontamination will be mandatory upon leaving the exclusion zone per Health and Safety Procedure No. 16.
- 4.7 Employees involved in emergency response operations will participate in the medical surveillance program per Health and Safety Procedure No. 7.

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SUBJECT:		NUMBER: 35	PAGE: 1 OF: 1				
	WELL DRILLING - NONHAZARDOUS SITES	DATE PUBLISHED:April 23, 1991					
		DATE REVISED:M	ay 17, 1994				

#### 1.0 POLICY

EARTH TECH and its contractors will meet applicable health and safety requirements on non-hazardous (Level D) well drilling operations.

#### 2.0 PURPOSE

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This procedure describes site safety requirements for well drilling operations on sites not considered hazardous.

#### 3.0 REQUIREMENTS

- 3.1 Minimum personal protective equipment includes:
- A Hard hat;
- Æ Eye protection;
- Steel toe work boots or shoes; and
- Leather gloves (when handling drilling equipment).
- 3.2 Direct reading air sampling will be conducted and documented utilizing a PID and an LEL meter. Work will be stopped whenever:
- A reading of >10 percent LEL is made at the bore hole; and/or
- A sustained reading of > 10 ppm is made in the workers' breathing zone.
- 3.3 An EARTH TECH employee will serve as site safety officer and will assure that this and all applicable EARTH TECH health and safety requirements are met. The site safety officer may also function in other capacities (chemist, geologist, sample technician, etc.).
- 3.4 For Level D sites, these procedures combined with the acknowledgement form from procedure No. 3 and the applicable portions of procedure No. 34 will comprise the site safety plan.

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	CONTRACTOR REQUIREMENTS	DATE PUBLISHED:April 23, 1991					
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#### 1.0 POLICY

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Contractors of EARTH TECH will comply with all applicable health and safety regulations as well as EARTH TECH site safety plans.

#### 2.0 PURPOSE

The purpose of the procedure is to provide EARTH TECH contracting agents with a method to verify contractor compliance with health and safety requirements.

#### 3.0 REQUIREMENTS

- 3.1 Contracting agents shall forward copies of the attached documents to prospective contractors or subcontractors as part of the contractor prequalification process.
- 3.2 EARTH TECH contracting agents shall assure completion of the Contractor Site Safety Rules Checklist and maintain copies with the project file.
- 3.3 Project managers shall maintain copies of forms at project sites for issuance to contractors.
- 3.4 Contractor employees shall attend a site safety plan review prior to the start of each project and sign the acknowledgement.
- 3.5 Contractors who use EARTH TECH-owned personal protective equipment or other supplies will sign the indemnification and release agreement.
- 3.6 Copies of all the forms described here follow this procedure.

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6. There are no multiple plug-ins to individual electrical sockets.

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D. Safety Equipment

hazardous liquids.

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1. An eye wash and safety shower are provided.

2. Two 20-pound fire extinguishers are available and checked. 3. Absorbent material is available in case of a spill involving

## HEALTH AND SAFETY PROCEDURES SUBJECT: NUMBER: 37 PAGE: 1 OF: 1 DATE PUBLISHED:April 23, 1991 DATE REVISED:May 20, 1994

#### 1.0 POLICY

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Periodic inspections of sites, shops, and other facilities will be used as a means of determining compliance with site safety plans, Earth Tech safety procedures, and applicable regulations.

#### 2.0 PURPOSE

This procedure describes requirements and checklists for conducting inspections.

#### 3.0 REQUIREMENTS

3.1 The Corporate Health and Safety Officer or his/her designee will conduct inspections according to the following schedule:

Job Sites	Weekly
Shops	<del>_</del>
PCTs	
Labs	

- 3.2 The checklists following this procedure may be used to comply with this procedure.
- 3.3 A written response from the site supervisor or operations manager will be required stating that appropriate corrective actions have been taken or documenting a due date for the corrective actions.

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#### CONTRACTOR SITE SAFETY RULES CHECKLIST

The following checklist shall be reviewed and signed by the prime contractor, and his subcontractors, and project manager or job site supervisor or designees, prior to the scheduled start of a job. While the job is in progress, where applicable, hazardous operations permits shall be obtained on a daily basis, or more frequently as appropriate, to assure safety.

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	All vehicles shall observe a maximum speed limit of 10 MPH, unless otherwise posted. There will be no passing of moving vehicles at job sites when narrow roads and short-sight distances exist.
$\square_2$	Hard hat and approved eye protection are required at all times except in designated areas.
$\square_3$	Smoking or eating is permitted only in designated areas.
<u></u> 4	Contractor is expected to maintain good housekeeping during the duration of work. Daily trash pick up is required. At the end of the job the Contractor shall leave the job site in at least as good an appearance and condition as it was found.
<u></u>	Contractor is to provide first-aid kit. Contractor hereby prescribes emergency hospital as indicated below:
	Hospital:Phone:
	Address:
<u></u> 6	Review with site supervisor the emergency evacuation route and telephone location. In case of emergency, notify site supervisor immediately and call the appropriate service.
	Fire Department:
	Ambulance:
	Sheriff:
	EARTH TECH work rules also prohibit:
	Possession or consumption of intoxicants or illegal drugs or narcotics Violation of Federal and State safety regulation Gambling Possession of firearms Fighting, horseplay, or practical joking Sabotage or pilfering Running, except in an emergency

Name P	rinted		Name Printed	
Contrac	tor Signature	Date	Representative Signature	Date
stop or	suspend work, at no		s and enforce these rules. EARTH TECH range time the Contractor fails to comply d safety procedures.	
	hazardous environi invalidate all perm is required before v	ment areas which cou its and approvals. Re work can be resumed.	work, confined space, or other hazardou ald affect previous test readings or safety etesting or reevaluation of the area, by a de	conditions shall esignated person,
14	Contractor personn shower, and eye ba		ation of the nearest fire extinguisher, fire	water line, safety
13	excavations and tre	enching, and other pl	opening procedures, scaffolding, use of hanned hazardous atmospheres and hazard ervisor before commencing work.	
12	Contractor shall pro	ovide a standby during	g confined space work and a fire watch dur	ring hot work.
<u>11</u>	for checking areas environments. Co	before confined spantractor is responsib	ated combustible gas/oxygen analyzer or of ce, hot work, or other work in hazardous ole for all testing and monitoring required. H shall be in lieu of above requirements.	s atmospheres or
HAZA	RDOUS ATMOSP	HERES AND HAZA	ARDOUS ENVIRONMENTS	
<u>10</u>	EARTH TECH rep the potential hazard	presentative has discust ds that may be encoun	ssed with the contractor and his subcontractered.	tors the nature of
<u></u> 9		personnel on the EARTH TECH mana	work site except for authorized contrac agement approval.	tor/subcontractor
LJ8	emergency conditi	ons no longer exist.	y damage) shall be reported to the site super The person involved shall make a written the by emergency conditions, i.e., injury.	ervisor as soon as n accident report

#### INDEMNIFICATION AND RELEASE AGREEMENT

FOR AND IN CONSIDERATION OF the use by the undersigned of property, equipment, or supplies belonging to EARTH TECH Remediation Services, formerly Environmental Technology of North America, Inc., and which may include full-face mask respirators, self-contained breathing apparatus, and other equipment and supplies, and other good and valuable consideration, the undersigned, for himself and his successors, and assigns, does hereby release and discharge EARTH TECH, their officers, employees, agents, and subcontractors from any and all claims, actions, demands, damages, costs, loss of services, expenses, compensation, third-party actions, or suits, including attorneys' fees, arising and resulting from the aforementioned use of property, equipment, or supplies belonging to EARTH TECH.

In particular, the undersigned, for himself and his successors, and assigns, agrees to save, hold harmless, protect, indemnify, and defend EARTH TECH, and its officers, employees, agents, and subcontractors against any and all claims, actions and expenses as above described, whether for bodily injury, property damage or destruction, or both, arising or resulting in any way from the use by the undersigned of property of EARTH TECH and agrees to save, hold harmless, protect, indemnify, and defend EARTH TECH against any such claims, actions, or expenses, referenced above, that might be brought against EARTH TECH by any third persons or the heirs, successors, executors or assigns of the undersigned.

The undersigned acknowledges by the signing hereof that he has carefully read this Agreement, understands the contents thereof, and has freely and voluntarily signed the same.

WITNESS my hand this	day of	, 19
SIGNED AND ACKNOWLEDGED IN THE PRESENCE OF:		

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7. Are only trained personnel permitted to operate welding and cutting equipment?  1. Are scaffolding and ladders placed on a flat, firm surface? equipment?  2. Are scaffold planks free of mud, ice, grease, etc.?  8. Are welding operations properly shielded?  4. Are defective scaffolding parts taken out of service?  1. Are defective hand and power tools tagged and taken out of service?  2. Is eye protection available and used when operating power tools?  3. Is scaffolding inspected before each use?  4. Are defective scaffolding parts taken out of service?  5. Does scaffold height exceed four times the width or base dimension?  6. Does scaffold planking overlap a minimum of 12 inches?  7. Does scaffold planking extend over end support between 6-18 inches?  8. Are employees restricted from working on scaffold during storms or	5. Are welding equipment and other machines properly grounded?			3. Equal Employment Opportunity		
equipment?  2. Are scaffold planks free of mud, ice, grease, etc.?  3. Is scaffolding inspected before each use?  4. Are defective scaffolding parts taken out of service?  5. Does scaffold height exceed four times the width or base dimension?  2. Is eye protection available and used when operating power tools?  6. Does scaffold planking overlap a minimum of 12 inches?  7. Does scaffold planking extend over end support between 6-18 inches?  8. Are employees restricted from working on scaffold during storms or	6. Are oxygen and fuel gas cylinders stored a minimum of 20 feet apart?			Scaffolding and Ladders		
8. Are welding operations properly shielded?  Hand and Power Tools  1. Are defective hand and power tools tagged and taken out of service?  2. Is eye protection available and used when operating power tools?  5. Does scaffold planking overlap a minimum of 12 inches?  7. Does scaffold planking extend over end support between 6-18 inches?  8. Are employees restricted from working on scaffold during storms or	7. Are only trained personnel permitted to operate welding and cutting			1. Are scaffolding and ladders placed on a flat, firm surface?		
Hand and Power Tools  1. Are defective hand and power tools tagged and taken out of service?  2. Is eye protection available and used when operating power tools?  3. Does scaffold planking overlap a minimum of 12 inches?  4. Are defective scaffolding parts taken out of service?  5. Does scaffold planking overlap a minimum of 12 inches?  7. Does scaffold planking extend over end support between 6-18 inches?  8. Are employees restricted from working on scaffold during storms or	equipment?			2. Are scaffold planks free of mud, ice, grease, etc.?		
1. Are defective hand and power tools tagged and taken out of service?  2. Is eye protection available and used when operating power tools?  5. Does scaffold height exceed four times the width or base dimension?  6. Does scaffold planking overlap a minimum of 12 inches?  7. Does scaffold planking extend over end support between 6-18 inches?  8. Are employees restricted from working on scaffold during storms or	8. Are welding operations properly shielded?			3. Is scaffolding inspected before each use?		
<ul> <li>2. Is eye protection available and used when operating power tools?</li> <li>6. Does scaffold planking overlap a minimum of 12 inches?</li> <li>7. Does scaffold planking extend over end support between 6-18 inches?</li> <li>8. Are employees restricted from working on scaffold during storms or</li> </ul>	Hand and Power Tools			4. Are defective scaffolding parts taken out of service?		_
<ul> <li>7. Does scaffold planking extend over end support between 6-18 inches?</li> <li>8. Are employees restricted from working on scaffold during storms or</li> </ul>	1. Are defective hand and power tools tagged and taken out of service?			5. Does scaffold height exceed four times the width or base dimension?		
8. Are employees restricted from working on scaffold during storms or	2. Is eye protection available and used when operating power tools?			6. Does scaffold planking overlap a minimum of 12 inches?	<del></del>	
• • • • • • • • • • • • • • • • • • • •				7. Does scaffold planking extend over end support between 6-18 inches?		
				• •		

Shop Locat	tion		Date//	
	Yes	No	Yes	No
9. Are all pins in place and wheels locked?		. <u></u>	_ Electrical	
10. Are both hands free when ascending or descending ladders?		· <u>-</u>	1. Are warning signs exhibited on high voltage equipment (250 V. or	
11. Are defective ladders taken out of service?		· <del></del>	greater)?	
Breathing Apparatus			Is electrical equipment and wiring properly guarded?	
1. Is breathing apparatus being inspected on a monthly basis?		-	3. Are electrical lines, extension cords, and cables guarded and	
2. Are out of service breathing air units clearly marked?		·	maintained in good condition?	
3. Are only certified persons permitted to perform repairs to breathing			4. Are extension cords kept out of wet areas?	
apparatus?		·	5. Is damaged electrical equipment tagged and taken out of service?	
4. Are breathing air cylinders charged to prescribed pressures?			Compressed Gas Cylinders	
5. Have breathing air cylinders been hydrostatically tested within			Are breathing air cylinders charged only to prescribed pressures?	
the past 4 years?		. <u>.</u>	2. Are like cylinders segregated in well ventilated areas?	
Materials Handling			3. Is smoking prohibited in cylinder storage areas?	
1. Are materials stacked and stored to prevent sliding or collapsing?		. <u>-</u>	4. Are cylinders stored secure and upright?	
2. Are flammables and combustibles stored in non-smoking areas?			5. Are cylinders protected from snow, rain, etc.?	
3. Is machinery braced when personnel are performing maintenance?		. <u>-</u>	6. Are cylinder caps in place before cylinders are moved?	
4. Are tripping hazards labeled?		·	7. Are fuel gas and $0_2$ cylinders stored a minimum of 20 feet apart?	
5. Are semi-trailers chocked?		· <del>- · · · · ·</del>	Confined Spaces	
6. Are fixed jacks used under semi-trailers?		· <u>-</u>	Have employees been trained in the hazards of confined spaces?	
7. Are riders prohibited on materials handling equipment?			2. Are confined space permits available at the shop?	
8. Are cranes inspected and logged as prescribed?			3. Is a confined space company safety procedure available?	
9. Are OSHA-approved manlifts provided for the lifting of personnel?			_	
10. Are all containers labeled as to contents?			_ I have reviewed this inspection checklist with the safety inspector and fully unders	stand th
11. Are flammable liquids stored in approved safety cans?			recommendations and will make every attempt to comply with them immediately.	
Fire Protection				
1. Has a fire alarm been established?			_	
2. Do employees know the location and use of all fire extinguishers?	_	·	Shop Supervisor	
3. Are fire extinguishers marked and inspected?			_	
4. Are combustible materials segregated from open flames?			_	
			Safety Inspector	

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Shop	Location		Date//		
	Yes	No		Yes	No
ledical And First Aid			6. Are oxygen and fuel gas cylinders stored a minimum of 20 feet apart?	<del></del>	
Are first aid kits accessible and identified?	<del></del>		7. Are only trained personnel permitted to operate welding and cutting		
Are emergency eye wash and safety showers available?			_ equipment?		
Are daily logs for first aid present and up to date?		. <u>-</u>	Hand And Power Tools		
. Are first aid kits inspected weekly?			1. Are defective hand and power tools tagged and taken out of service?		
ersonal Protective Equipment			2. Is eye protection available and used when operating power tools?		
Have levels of personal protection been established?			3. Are guards and safety devices in place on power tools?		
Do all employees know their level of protection?			4. Are power tools inspected before each use?		
Are respirators used, decontaminated, inspected, and stored			5. Are non-sparking tools available?		
according to standard procedures?			_ Motor Vehicles		
. Have employees been fit-tested?			1. Are vehicles inspected before each use?		
. Is defective personal protective equipment tagged?			2. Are personnel licensed for the equipment they operate?		
. Does compressed breathing air meet CGA grade "D" minimum?		. <u></u>	3. Are unsafe vehicles tagged and reported to supervision?		
Are there sufficient quantities of safety equipment and repair parts?		. <u></u>	4. Are vehicles shut down before fueling?		
ire Prevention			5. When backing vehicles, are spotters provided?		
. Is smoking prohibited in flammable storage areas?			6. Is safety equipment on vehicles?		
. Are fire lanes established and maintained?		· <u>-</u>	7. Are loads secure on vehicles?		-
. Are flammable dispensing systems grounded and bonded?			_ Emergency Plans		
. Are proper receptacles available for storage of flammables?			1. Are emergency telephone numbers posted?		
. Has the local fire department been contacted?		. <u></u>	2. Have emergency escape routes been designated?		
Velding And Cutting			3. Are employees familiar with the emergency signal?		
. Are fire extinguishers present at welding and cutting operations?		. <u></u> -	Materials Handling		
. Are confined spaces, such as, tanks, pipelines, and trenches, tested			1. Are materials stacked and stored as to prevent sliding or collapsing?		
prior to cutting and welding operations?			2. Are flammables and combustibles stored in non-smoking areas?		
. Are hot work permits available?			3. Is machinery braced when personnel are performing maintenance?		. <u>—</u> —
. Are proper helmets, aprons and gloves available for welding and			4. Are tripping hazards labeled?		. <u></u>
cutting operations?			5. Are semitrailers chocked?		
. Are welding and machines properly grounded?			6. Are fixed jacks used under semitrailers?		
			7. Are riders prohibited on materials handling equipment?	<del></del>	. <u>—</u> —
			8. Are cranes inspected as prescribed and logged?		
			9. Are OSHA-approved manlifts provided for the lifting of personnel?		
			10. Are all containers labeled as to contents?		

#### SAFETY INSPECTION PROJECT SITES

Project Name		Project Location			
Site Supervisor	Inspector's	Name Date/			
· Y	es No		Yes	No	
11. Are flammable liquids stored in approved safety cans?		7. Are fuel gas and 0 <sub>2</sub> cylinders stored a minimum of 20 feet apart?			
Fire Protection					
1. Has a fire alarm been established?		Scaffolding			
2. Do employees know the location and use of all fire extinguishers?		1. Is scaffolding placed on a flat, firm surface?			
3. Are fire extinguishers marked and inspected weekly?		2. Are scaffold planks free of mud, ice, grease, etc.?			
4. Are combustible materials segregated from open flames?		3. Is scaffolding inspected before each use?			
Electrical		4. Are defective scaffold parts taken out of service?			
1. Are warning signs exhibited on high voltage equipment (250 V. or		5. Does scaffold height exceed 4 times the width or base dimension?	-,		
greater)?		6. Does scaffold planking overlap a minimum of 12 inches?			
Is electrical equipment and wiring properly guarded?		7. Does scaffold planking extend over end supports between 6" to 18"?			
3. Are electrical lines, extension cords, and cables guarded and		8. Is general housekeeping up to EARTH TECH standards?			
maintained in good condition?		Walking And Working Surfaces			
4. Are extension cords kept out of wet areas?		1. Are accessways, stairways, ramps, and ladders clean of ice, mud			
5. Is damaged electrical equipment tagged and taken out of service?		snow or debris?			
6. Have underground electrical lines been identified by proper		2. Do ladders exceed maximum lengths?			
authorities?		3. Are ladders used in passageways, doors, or driveways?			
7. Has a positive lock-out system been established by the project		4. Are broken or damaged ladders tagged and taken out of service?			
electrician?		5. Are metal ladders prohibited in electrical service?			
Slings And Chains		6. Are stairways and floor openings guarded?			
Are damaged slings, chains, and rigging tagged and taken out		7. Are safety feet installed on straight and extension ladders?		. <u></u>	
of service?		8. Is general housekeeping up to EARTH TECH standards?			
2. Are slings inspected before each use?		Site Safety Plan			
3. Are slings padded or protected from sharp corners?		1. Is a site safety plan posted on site or accessible to all employees?			
4. Do employees keep clear of suspended loads?		2. Have potential hazards been described to employees on site?			
Compressed Gas Cylinders		3. Are manufacturer safety data sheets available for review by			
Are breathing air cylinders charged only to prescribed pressures?	<u></u>	employees on site?			
Are like cylinders segregated in well ventilated areas?	<u></u>	4. Is there a designated safety official on site?			
3. Is smoking prohibited in cylinder storage areas?		5. Are employees aware and knowledgeable of the results of exposure?			
4. Are cylinders stored secure and upright?		•			
5. Are cylinders protected from snow, rain, etc.?		Site Posters			
6. Are cylinder caps in place before cylinders are moved?		Are the following documents posted in a prominent and accessible area?			
- · · · ·					

Site Supervisor		Inspector	s Name Date/	
	Yes	No	Yes N	lo
1. Minimum Wage			4. Are ladders used in trenches over 4 feet deep?	
2. OSHA Health and Safety			5. Is material excavated placed a minimum of 24 inches from	
3. Equal Employment Opportunity		·	the trench?	
Site Set Up			Confined Spaces	
1. Are work zones clearly defined?			1. Have employees been trained in the hazards of confined spaces?	
2. Are support trailers located to minimize exposure from a potential			2. Are confined space permits available on project site?	
release?			3. Is a confined space company safety procedure on the project site?	
3. Are support trailers accessible for approach by emergency vehicles?			Personnel Decontamination	
4. Is the site properly secured during and after work hours?			Are decontamination stations set up on site?	
Heavy Equipment			2. Is a contamination reduction zone set up on site?	
1. Is heavy equipment inspected as prescribed by the manufacturer?			3. Are waste receptacles available for contaminated clothing?	
2. Is defective heavy equipment tagged and taken out of service?			4. Are steps taken to contain liquids used for decontamination?	
3. Are project roads and structures inspected for load capacities	_		5. Have decontamination steps and procedures been covered by the	
and proper clearances?			site supervisor or safety official?	
4. Is heavy equipment shut down for fueling and maintenance?			6. Is all personal protective equipment and respiratory equipment	
5. Are back-up alarms installed and working on equipment?			being cleaned on a daily basis?	
6. Are only designated operators operating equipment?				
7. Are riders prohibited on heavy equipment?				
8. Are guards and safety appliances in place and used?			I have reviewed this inspection checklist with the safety inspector and fully understa	and the
9. Are OSHA-approved manlifts provided for the lifting of personnel?			recommendations and will make every attempt to comply with them immediately.	
Excavation				
1. Are the sides of excavations sloped or shored to prevent caving in on employees?			Site Supervisor	
2. Are guardrails or fences placed around excavations, near pedestrian or vehicle thoroughfares?			Safety Inspector	
3. Prior to opening excavations, are utilities located and marked?				

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#### SAFETY INSPECTION PROJECT SITES

Project Name	Project Location
Site Supervisor	Inspector's Name Date //
Yes	No Yes No
A. Safety Practices	4. There are convenient hand washing facilities.
. A written emergency plan is readily available to all personnel.	5. All areas are clean and uncluttered.
Mouth pipetting is prohibited.	6. The lighting is appropriate.
There is a current written record of the hazardous materials being	7. There is a separately, clearly marked container for broken glass,
stored or used in the laboratory.	needles, and other sharp waste material.
Doors are kept closed.	D. Safety Equipment
Hazardous processes are done in a hood.	1. An eye wash and safety shower are provided.
Eating, chewing, drinking and smoking are prohibited.	2. Two 20-pound fire extinguishers are available and checked.
Appropriate disinfection is used.	3. Absorbent material is available in case of a spill involving
Safety showers are certified annually and eye wash stations are	hazardous liquids.
tested weekly.	4. Appropriate personal protection (lab coat, face shield, gloves,
A formal safety orientation is provided at least annually for all	splash goggles, etc.) is available and used.
people at risk.	5. An appropriate first aid kit is available and is regularly inspected
0. Hands are washed frequently, especially before leaving the	and resupplied.
laboratory.	6. Appropriate signs are posted.
Liquid spills are cleaned up immediately to avoid slips and falls.	7. Non-breakable containers are used for transporting primary
3. Physical Safety	containers.
. There is a safe egress from each end of laboratory.	8. All belts, pulleys, and other exposed moving equipment parts are
There are no tripping hazards.	guarded.
The floors, walls, and ceiling are in good repair.	E. Chemicals, Storage and Labeling
The aisles are unobstructed.	1. All compressed gas cylinders are labeled, secured, capped (if not
All equipment is appropriately maintained in good repair.	in use), and away from heat sources.
Building air movement is in the direction from areas of lesser to	2. Incompatible chemicals are segregated.
areas of greater hazard.	3. Heavy objects are stored at a level of 5 feet above the floor
. All hoods are certified annually.	or lower.
Exits are clear with stairways and handrails.	4. Peroxide-forming chemicals are dated when purchased and when first
C. General Sanitation	opened. Outdated chemicals are safely disposed of.
. Waste containers are easily cleanable.	5. All shelving and cabinets are used in a manner to prevent tipping
Hazardous waste containers are clearly marked.	or one anchored securely.
. Appropriate methods of hazardous waste disposal are used.	6. There is sufficient storage space.

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Needs Needs Yes Attention Yes Attention 7. All containers are correctly labeled. 8. Flammable liquid storage cabinets are provided where more than 10 gallons are stered. 9. Chemical storage areas are adequately ventilated. 10. Flammable liquid storage areas are tabeled "Flammable, Keep Fire Away" or "No Smoking." 11. Flammable liquid storage areas are free of ignition sources. F. Electrical Safety 1. All electrical outlets are correctly grounded. 2. All electrical equipment is correctly grounded or double insulated. 3. An over temperature shut-off switch is provided for unattended heating equipment. 4. All refrigeration equipment is labeled to indicate suitability or unsuitability for the storage of flammable liquids. 5. All electrical cords are in a safe condition and of sufficient capacity. 6. There are no multiple plug-ins to individual electrical sockets.

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# HEALTH AND SAFETY PROCEDURES SUBJECT: NUMBER: 38 PAGE: 1 OF: 3 DATE PUBLISHED:April 23, 1991 DATE REVISED:May 17, 1994

#### 1.0 POLICY

EARTH TECH will identify and categorize potential health and safety hazards for each work site and follow a work-procedures program to ensure the health and safety of employees who are required to participate in or work around drilling equipment.

#### 2.0 PURPOSE

This document will review the types of drill rigs, associated hazards, and safety procedures for drilling activities.

# 3.0 REQUIREMENTS

# A. Rotary Drills

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- 1. Use a drilling fluid to remove cuttings from the borehole as the drill advances. Stabilize the borehole and keep it open. Cool and lubricate the drill bit, and control buildup fluids and cuttings.
- 2. The fluid can be air, mud, polymer, water, or a combination of these elements. Ensure that site-specific fluid is used.

# B. Hollow-Stem Auger

- 1. The dry drill technique can be used only in unconsolidated sediments.
- 2. Depth limits are 50 to 150 feet.

#### C. Cable Tool Rigs

- 1. This technique involves driving the casing with an overhead weight.
- 2. A small amount of water is added to the borehole, and the cuttings are bailed from inside the casing.
- This technique is used in glacial till soils.

# 4.0 HAZARDS

# A. Drill Rig Hazards

1. Air rotary drilling: compressor hose can break loose, fly around uncontrollably, damage equipment, and seriously injure or kill personnel.



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- 2. Stacked pipes could collapse.
- 3. Heavy equipment (i.e., drill rig, compressor, water truck, flat-bed truck) can pose a variety of hazards.
- 4. Rope used to hoist a cathead during sampling can slip or break.
- 5. The weight used to drive the split-spoon is located overhead and metal can be released if the split-spoon disintegrates.
- 6. Cuttings, drilling liquids, and ground water may be contaminated.
- 7. The borehole provides a conduit for hazardous fluid vapors to reach the surface.
- 8. Rotary drilling with air can cause air stripping of hazardous volatiles that may be present in the soil; these vapors can become concentrated at the wellhead.
- 9. Slips, trips, and falls.
- 10. Becoming entwined in rotating tools.
- 11. Drilling into underground cables or becoming entwined in electrical power lines.
- 12. Exposure to hot engine parts.

# B. Major Accidents

- 1. Blowouts: uncontrolled escape of gas, oil, or water that may lead to fire, explosion, drilling rig destruction, injury, or death.
- 2. Hydrogen sulfide is most likely encountered in deep wells drilled next to oil or gas fields. This gas is dangerous because of its hard-to-detect odor as a warning and the sudden onset of incapacitation.

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# 5.0 SAFETY PROCEDURES

A. Use common sense.

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- B. Know the location of underground and overhead utilities.
- C. Use required personal protective equipment; do not wear loose-fitting clothing or jewelry.
- D. Do not touch or go near moving parts.
- E. Know the location of "Emergency Shut Off" switches.
- F. Stay away from operating equipment, especially if rig is located on unstable terrain.
- G. In the event of an accident, allow properly equipped and protected personnel to respond. Immediately leave the area.
- H. Do not smoke or use spark-producing equipment around drilling operations.
- I. Do not work around a drill rig during a thunderstorm or rain.

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#### 1.0 POLICY

The excavation of drums is a two-part procedure: excavation which will is performed in accordance with 29 CFR 1926 Subpart P and drum handling. Because excavation and drum handling introduces the potential for danger, every step of the operation will be carefully planned, based on all available information.

#### 2.0 PURPOSE

This procedure provides technical guidance on the safe excavation and handling of drums and other containers.

#### 3.0 REQUIREMENTS

## A. Planning

Because drum handling introduces the potential for danger, every step of the operation should be carefully planned, based on all available information. The results of the preliminary inspection can be used to determine (1) if any hazards are present and the appropriate response, and (2) which drums need to be moved in order to be opened and sampled. A preliminary plan should be developed that specifies the procedures based on the hazards associated with the probable drum contents as determined by visual inspection. This plan should be revised as new information is obtained during drum handling.

# B. Handling

The purpose of handling is to (1) respond to any obvious problems that might impair worker safety, such as radioactivity, leakage, or the presence of explosive substances, (2) unstack and orient drums for sampling, and (3) if necessary, to organize drums into different areas on site to facilitate characterization and remedial action. Handling may or may not be necessary, depending on how the drums are positioned at a site.

Since accidents occur frequently during handling, particularly initial handling, drums should be handled only if necessary. Prior to handling, all personnel should be warned about the hazards of handling and instructed to minimize handling by using remote methods. In all phases of handling, personnel should be alert for new information about potential hazards. Personnel should respond to new hazard information before continuing with routine handling operations. Overpack drums (larger drums in which leaking or damaged drums are placed for storage or shipment (see 49 CFR Part 173.3(c)) and an adequate volume of absorbent volume of adsorbent should be kept near areas where minor spills may occur. Where major spills may occur, a containment berm adequate to contain the entire volume of liquid in the drums should be constructed prior to any drum handling. If drum contents spill, personnel trained in spill-response procedures should isolate and contain the spill.

Several types of equipment can be used to move drums: (1) A drum grappler attached to a hydraulic excavator; (2) a small front-end loader, which can be either loaded manually or equipped with a bucket sling; (3) a rough-terrain forklift; (4) a roller conveyor equipped with solid rollers; and (5) drum carts designed specifically for drum handling. Sometimes drums are moved manually. The drum grappler is the

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preferred piece of equipment for drum handling. The grappler distances the operator from the drums so there is less likelihood of injury if the drums detonate or rupture. If the drum is leaking, the operator can stop the leak by rotating the drum and immediately placing it into an overpack. In case of an explosion, grappler claws help protect the operator by partially deflecting the force of the explosion.

The following procedures can be used to maximize worker safety during drum handling and movement:

- Train personnel in proper lifting and moving techniques to prevent back injuries.
- Make sure the vehicle selected has sufficient rated load capacity to handle the anticipated loads and can operate smoothly on the available road surface.
- Air condition vehicle cabs to increase operator efficiency; protect the operator with heavy splash and/or blast shields.
- Supply operators with appropriate respiratory protective equipment when needed. Normally, either a combination SCBA/SAR with the air tank fastened to the vehicle or an airline respirator and an escape SCBA are used because of the high hazard potential of drum handling. Respiratory equipment improves operator efficiency and provides protection in case the operator must abandon the equipment.
- Have overpacks ready before attempting to move drums.
- Before moving containers, determine the most appropriate sequence for moving the various drums and other containers. For example, small containers may have to be removed first to permit heavy equipment to enter and move larger drums.
- Exercise extreme caution in handling drums that are not intact and tightly sealed.
- Ensure that operators have a clear view of the roadway when carrying drums. If necessary, station ground workers to guide the operator's motion.

#### **Drums Containing Radioactive Waste**

If the drum exhibits radiation levels above background, immediately contact a health physicist. Do not handle any drums that are determined to be radioactive before consulting individuals with expertise in this area.

#### **Drums that May Contain Explosive or Shock-Sensitive Waste**

- If a drum is suspected to contain explosive or shock-sensitive waste as determined by visual inspection, seek specialized assistance before handling.
- If handling is necessary, handle these drums with extreme caution.
- Prior to handling these drums, move all nonessential personnel a safe distance away.



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- Use a grappler unit constructed for explosive containment for initial handling of such drums.
- Place drums on pallets prior to transport. Secure drums to pallets.
- Use an audible siren signal system, similar to the type used in conventional blasting operations, to signal the commencement and completion of explosive waste handling activities.
- Maintain continuous communications with the Site Safety Officer and/or the command post until drum handling operations are complete.

# **Bulging Drums**

- Pressurized drums are extremely hazardous. Wherever possible, do not move drums that are internally pressurized, as evidenced by bulging or swelling.
- If a pressurized drum must be moved, whenever possible handle the drum with a grappler unit constructed for explosive containment. Either move the bulged drum only as far as necessary to allow seating on firm ground or carefully overpack the drum. Exercise extreme caution when working with or adjacent to potentially pressurized drums.

#### Leaking, Open, and Deteriorated Drums

- If a drum containing a liquid cannot be moved without rupture, immediately transfer its contents to a sound drum using a pump designed for liquid transfer.
- Using a drum grappler, immediately place the following damaged drums in overpack containers:

Leaking drums that contain sludges or semi-solids.

Open drums that contain liquid or solid waste.

Deteriorated drums that can be moved without rupture.

#### **Buried Drums**

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- Prior to initiating subsurface excavation, use ground-penetrating systems to estimate the location and depth of the drums.
- Remove soil with great caution to minimize the potential for drum rupture.
- Keep a dry chemical fire extinguisher on hand to control small fires.



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### **Opening**

Drums are usually opened and sampled in place during site investigations. However, remedial and emergency operations may require a separate drum-opening area. Procedures for opening drums are the same regardless of location. To enhance the efficiency and safety of drum-opening personnel, the following procedures should be instituted.

- If a supplied-air respiratory protection system is used, place a bank of air cylinders outside the work area and supply air to the operators via airlines and escape SCBAs. This practice enables workers to operate in relative comfort for extended periods of time.
- Protect personnel by keeping them at a safe distance from the drums being opened. If personnel must be located near the drums, place explosion-resistant plastic shields between them and the drums as protection in case of detonation. Locate controls for drum-opening equipment, monitoring equipment, and fire-suppression equipment behind the explosion-resistant plastic shield.
- If possible, monitor drums continuously during opening. Place monitoring equipment sensors, such as colormetric tubes, dosimeters, radiation survey instruments, explosion meters, organic vapor analyzers, and oxygen meters as close as possible to the source of contaminants, i.e., at the drum opening.
- Use the following remote-controlled devices for opening drums:

Pneumatically operated impact wrench to remove drums bungs.

Hydraulically or pneumatically operated drum piercers.

Backhoes equipped with bronze spikes for penetrating drum tops in large-scale operations.

- Do not use picks, chisels or firearms to open drums.
- Hang or balance the drum-opening equipment to minimize worker exertion.
- If the drum shows signs of swelling or bulging, perform all steps slowly. Relieve excess pressure prior to opening and, if possible, from a remote location using devices such as a pneumatic impact wrench or hydraulic penetration device. If pressure must be relieved manually, place a barrier, such as explosion-resistant plastic sheeting, between the worker and bung to deflect any gas, liquid, or solids that may be expelled as the bung is loosened.
- Open exotic metal drums and polyethylene or polyvinyl chloride-lined (PVC-lined) drums through the bung by removal or drilling. Exercise extreme caution when manipulating these containers.
- Do not open or sample individual containers within laboratory packs.
- Reseal open bungs and drill openings as soon as possible with new bungs or plugs to avoid explosions and/or vapor generation. If an open drum cannot be resealed, place the drum into an



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overpack. Plug any openings in pressurized drums with pressure-venting caps set to a 5-psi (pounds per square inch) release to allow venting of vapor pressure.

Decontaminate equipment after each use to avoid mixing incompatible wastes.

## **Drum Segregation and Staging**

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Before moving drums or containers, employees with the transfer operation should be warned of the potential hazards associated with the contents of the drums or containers and should review the latest site information and risk analysis forms. In congested areas where drums are staged, EARTH TECH personnel will use forklifts to move drums to minimize abrasions, pinch hazards, etc.

Prior to handling or moving any containers, the foreman will inspect the condition and integrity of all containers and recommend to the Project Manager the necessary procedures to be followed. Drums will be marked to indicate acceptability for handling. Specific locations for drum staging will be constructed during site mobilization. These areas will be equipped with all proper safety and emergency equipment necessary to contain spills and releases. Exact staging locations will be noted on the site plan and incorporated into this HASP using the task risk (job safety) analysis form.

The United States Department of Transportation (USDOT)-specified salvage drums or containers and sizable quantities of proper absorbent and neutralizers (diatomaceous earth, citric acid powder, soda ash, activated carbon, sorbent pads, and boom) will be available and used in areas where spills, leaks, or ruptures may occur.

For major spills or leaks, a customized spill pallet with all necessary tools and equipment will be moved into position. The pallet will contain sorbent media, neutralizing media, tools and equipment, and fire extinguishers. The pallet will be accessible and fully stocked at all times to respond to spills, leaks, or releases during the project.

Drums and containers that cannot be moved without rupture, leakage, or spillage will be emptied into a sound container using a device classified for the material being transferred. Typically, this would be done with an explosion-proof transfer pump or a peristaltic pump. Soil or covering material will be removed with caution to prevent drum or container rupture. Fire extinguishers will be available to control small fires. Personnel will don level B PPE to include Saran suits and chemical-resistent gloves/booties.

Chemical spills, splashes, and reactions between incompatible chemicals present the greatest risks for exposure in these operations. The principal routes of exposure are skin contact and inhalation. An emergency eyewash station will be present in the work area.

To minimize hazards, the following standard operating procedures will be followed when handling drums and containers:

Drums and containers used during the cleanup will meet the appropriate DOT, OSHA, and USEPA regulations for their respective wastes. When in doubt about the proper container, ask the foreman.



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- Drums and containers will be inspected and their integrity ensured prior to being moved. Drums or containers that cannot be inspected before being moved because of inaccessible storage conditions will be moved to an open location and inspected before further handling.
- Unlabeled drums and containers will be considered to contain hazardous substances and will be handled accordingly until the contents are positively identified and noted on the label.

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#### 1.0 POLICY

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Drums and other containers will be sampled to characterize their contents.

#### 2.0 PURPOSE

This procedure provides technical guidance on implementing safe and cost-effective response actions applicable to hazardous waste sites containing drums. Container contents are sampled and characterized for disposal, bulking, recycling, grouping, and/or classification purposes.

#### 3.0 REQUIREMENTS

Prior to sampling, drums must be inventoried, staged, and opened. Inventory entails recording visual qualities of each drum and any characteristic pertinent to the contents' classification. Staging involves the organization, and sometimes consolidation of drums that have similar wastes or characteristics. Closed drums can be opened manually or remotely. Remote drum opening is recommended for worker safety. The most common method of sampling a drum involves the use of a glass thief. This method is quick, simple, relatively inexpensive, and requires no decontamination.

# 4.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

- No preservatives shall be added to the sample.
- Place sample container in two Ziplock<sup>♠</sup> plastic bags.
- Place each bagged container in a one-gallon, covered can containing absorbent packaging material. Place lid on can.
- Mark the sample identification number on the outside of the can.
- Place marked cans in a cooler, and fill remaining space with absorbent packing material.
- Fill out chain of custody record for each cooler, place in plastic, and affix to the inside of the cooler lic.
- Secure and custody seal the cooler lid.
- Arrange for the appropriate transportation mode consistent with the type of hazardous waste involved.

#### 5.0 INTERFERENCES AND POTENTIAL PROBLEMS

The practice of tapping drums to determine their contents is neither safe nor effective and should not be used if the drums are visually over pressurized or if shock-sensitive materials are suspected.



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<u>Do not move</u> drums that have been overpressurized to the extent that the head is swollen several inches above the level of the chime. A number of devices have been developed for venting critically swollen drums. One proven method is a tube and spear device. A light aluminum tube (3 meters long) is positioned at the vapor space of the drum. A rigid, hooking device attached to the tube goes over the chime and holds the tube securely in place. The spear is inserted in the tube and positioned against the drum wall. A sharp blow on the end of the spear drives the sharpened tip through the drum and the gas vents along the grooves. Venting should be done from behind a wall or barricade. This device can be cheaply and easily designed and constructed. Once the pressure has been relieved, the bung can be removed and the drum sampled.

## 6.0 EQUIPMENT/APPARATUS

The following are standard programs, plans and materials and equipment required for sampling:

- Health and Safety Plan
- Personal Protective Equipment (PPE)
- Wide-month glass jars with Teflon<sup>®</sup> cap liner and approximately 500-ml volume.
- Wniquely numbered sample identification labels with corresponding data sheets.
- One-gallon covered cans half-filled with absorbent.
- Chain-of-custody sheets.
- Decontamination plan and materials.
- Glass thieving tubes and materials.
- Non-sparking drum opening devices.

#### Bung Wrench

A universal bung wrench is commonly used to manually open drums. These wrenches have fittings to remove nearly all bung types. Wrenches are usually constructed of cast iron, brass, or a bronze-beryllium, nonsparking alloy formulated to reduce the likelihood of sparks.

The use of a "NONSPARKING" wrench does not completely eliminate the possibility of a spark being produced.

# **Drum Deheader**

If a drum cannot be opened manually with a bung wrench, another alternative is a drum deheader. Constructed of forged steel with an alloy steel blade, this tool is designed to completely or partially cut the lid of a drum with scissor-like cutting action. A limitation of this device is that it can be attached only to closed-head drums. Drums with removable heads must be opened by other means.

### Hand Pick, Pickaxe, and Hand Spike

These tools are usually constructed of brass or a nonsparking alloy with a sharpened point that can penetrate a drum lid or head when the tool is swung. Hand picks or pickaxes are commonly used and commercially available; spikes are generally uniquely fabricated four-feet poles with a pointed end.

#### **Backhoe Spike**



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The most common tool for remotely opening drums for sampling is a metal spike attached or welded to a backhoe bucket. This is an efficient opening method that greatly reduces the likelihood of personnel exposure.

## Hydraulic Drum Opener

Currently, there are fabricated hydraulic devices that can effectively open drums remotely to minimize exposure. This device uses hydraulic pressure to pierce through the wall of a drum. It consists of a manually operated pump which pressurize soil through a length of hydraulic line.

#### Pneumatic Devices

A pneuma ic bung remover consists of a compressed air supply that is controlled by a heavy-duty, two-stage regulator. A high-pressure air line of desired length delivers compressed air to a pneumatic drill, which turns a sized fitting to remove the bung. An adjustable bracketing system has been designed to position and align the pneumatic drill over the bung. This bracketing system must be attached to the drum before the drill can be operated. Once the bung has been loosened, the bracketing system must be removed before the drum can be sampled. This remote bung opener does not permit the slow venting of the container, therefore appropriate precautions must be taken. It also requires the container to be upright and relatively level. Bungs that are rusted shut cannot be removed with this device.

#### 7.0 REAGENTS

Decontam nation of sampling equipment should follow the site specific health and safety plan.

### 8.0 PROCEDURE

#### 8.1 Drum Staging

Prior to sampling, the drums should be staged to allow easy access. Ideally, the staging area should be located just far enough from the drum opening area to prevent a chain reaction if a drum explodes or ignites when opened.

During staging, the drums should be physically separated into the following categories: those containing liquids, those containing solids, lab packs, gas cylinders, and those which are empty. The strategy for sampling and handling drums/containers in each of these categories will be different.

#### Drum segregation strategy entails:

- Visual inspection of the drum and its labels, codes, etc. Solids and sludges are typically disposed of in open-top drums. Closed-head drums with a bung opening generally contain liquid.
- Wisual inspection of the contents of the drum during sampling, followed by restaging, is needed.



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Once a drum has been excavated and any immediate hazard has been eliminated by overpacking or transferring the drum's contents, the drum is affixed with a numbered tag and transferred to a staging area. Color-coded tags, labels or bands should be used to mark similar waste types. A description of each drum, its condition, any unusual marking, and the location where it was buried or stored are recorded on a drum data sheet. This data sheet becomes the principal record-keeping tool for tracking the drum on site.

Drums suspected to contain radioactive, explosive, and shock-sensitive materials should be staged in a separate, isolated area. Placement of explosives and shock-sensitive materials in diked and fenced areas will minimize the hazard and the adverse effect of any premature detonation of explosives.

If space allows, the drum-opening area should be physically separated from the drum-removal and drum-staging operations. Drums are moved from the staging area to the drum-opening area one at a time using forklift trucks equipped with drum grabbers or a barrel grappler. In a large-scale drum handling operation, drums may be conveyed to the drum opening area using a roller conveyer.

## 8.2 Drum Opening

There are three basic techniques available for opening drums at hazardous waste site:

- manual opening with nonsparking bung wrenches,
- drum deheading, and
- remote drum puncturing or bung removal.

The choice of drum-opening techniques and accessories depends on the number of drums to be opened, their waste contents, and physical condition. Remote drum-opening equipment should always be considered to protect workers. Under OSHA 1910.120, manual drum opening with bung wrenches or deheaders should be performed ONLY with structurally sound drums and waste contents that are not shock sensitive, nonreactive, nonexplosive, and nonflammable.

#### 8.2.1 Manual Drum Opening

#### 8.2.1.1 Bung Wrench

Bung wrenches should not be used to manually open drums unless the drums are structurally sound (no evidence of bulging or deformation) and their contents are known to be nonexplosive. If opening the drum with bung wrenches is deemed to be reasonably cost-effective and safe, then the following procedures should be implemented to minimize the hazard:

- Field personnel should be fully outfitted with protective gear.
- Drums should be positioned upright with the bung up, or, for drums with bungs on the side, lain on their sides with the bung plugs up.
- The wrenching motion should be a slow, steady pull across the drum. If the length of the bung wrench handle provides inadequate leverage for unscrewing the plug, a "cheater bar" can be attached to the handle to improve leverage.



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### 8.2.1.2 Drum Deheading

Drums are opened with a drum deheader by first positioning the cutting edge just inside the top chime and then tightening the adjustment screw to hold the deheader against the side of the drum. Moving the handle of the deheader up and down while sliding the deheader along the chime will enable the entire top to be rapidly cut off if so desired. If the top chime of a drum has been damaged or badly dented, it may not be possible to cut the entire top off. Because there is always the possibility that a drum may be under pressure, the initial cut should be made very slowly to allow for the gradual release of any built-up pressure. A safer technique would be to employ a remote opening method prior to using a deheader. Self-propelled drum openers that are either electrically or pneumatically driven are available and can be used for quick and efficient deheading.

## 8.2.1.3 Hand Pick or Spike

When a drum must be opened for sampling and neither a bung or wrench nor a drum deheader is suitable, use a hand pick, pickaxe, or spike. Often the drum lid or head must be hit with force to penetrate it. Because the potential for splash or spraying is greater than with other opening methods, this method of drum opening is not recommended, particularly when opening drums containing liquids. Some spikes used for this procedure have been modified by the addition of a circular splash plate near the penetrating end. This plate acts as a shield to reduce the amount of splash in the direction of the person using the spike. Even with this shield, good splash gear is essential.

Spray from drums is common and appropriate safety measures must be taken since some may be under pressure and will open quickly with these tools. The pick or spike should be decontaminated after each drum is opened to avoid cross contamination and/or adverse chemical reaction from incompatible materials.

## 8.2.2 Remote Opening

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Remotely operated drum opening tools are the safest available means of drum opening. Remote drum opening is slow, but provides a high degree of safety compared to manual opening methods.

#### 8.2.2.1 Backhoe Spike

Drums should be "staged" or placed in rows with adequate aisle space to allow ease in backhoe maneuvering. Once staged, the drums can be quickly opened by punching a hole in the drum head with the spike.

The spike should be decontaminated after each drum is opened to prevent cross contamination. Even though some splash or spray may occur when this method is used, the backhoe operator can be protected by mounting a large shatter-resistant shield in front of the operator's cage. This should be sufficient to protect the operator.

Additional respiratory protection can be afforded by providing the operator with an air line system on the equipment.



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# 8.2.2.2 Hydraulic Devices

A piercing device with a metal point is attached to the end of a hydraulic line and is pushed into the drum by hydraulic pressure. The piercing device can be attached so that a hole for sampling can be made in either the side or the head of the drum.

Some metal piercers are hollow or tube-like so that they can be left in place if desired and serve as a permanent tap or sampling port.

The piercer is designed to establish a tight seal after penetrating the container.

# 8.3 Drum Sampling

After the drum has been opened, preliminary monitoring of headspace gases should be performed using an explosimeter and organic vapor analyzer. In most cases, it is impossible to observe the contents of these sealed or partially sealed vessels. Since some layering or stratification is likely in any solution left undisturbed over time, a sample must be taken that represents the entire depth of the vessel.

When sampling a previously sealed vessel, check for the presence of a bottom sludge. This is easily accomplished by measuring the depth to apparent bottom, then comparing it to the known interior depth of the drum.

# 8.3.1 Glass Thief Sampler

The most widely used instrument for sampling is a glass tube (glass thief, 6 mm to 16 mm I.D.X. 48 inch length). This tool is simple, cost effective, quick, and collects a sample without having to decontaminate.

#### Specific Sampling Procedure Using a Glass Thief

- 1. Remove cover from sample container.
- 2. Insert glass tubing almost to the bottom of the drum or until a solid layer is encountered. About 1 foot of tubing should extend above the drum.
- 3. Allow the waste in the drum to reach its natural level in the tube.
- 4. Cap the top of the sampling tube with a tapered stopper or thumb, ensuring the liquid remains within the stopper.
- 5. Carefully remove the capped tube from the drum and insert the uncapped end in the sample container. Do not spill liquid on the outside of the sample container.
- 6. Release stopper and allow the glass thief to drain completely into the sample container. Fill the container to about  $\partial$  of capacity.
- 7. Remove tube from the sample container, break it into pieces, and place the pieces in the drum.



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- 8. Cap the sample container tightly and place pre-labeled sample container in a carrier.
- 9. Replace the bung or place the pieces in the drum.
- 10. Transport sample to decontamination zone for preparation for transport to analytical laboratory.

In many instances, a drum containing waste material will have a sludge layer on the bottom. Slow insertion of the sample tube down into this layer and then a gradual withdrawal will allow the sludge to act as a bottom plug to maintain the fluid in the tube. The plug can be gently removed and placed into the sample container by using a stainless-steel lab spoon.

It should be noted that in some instances disposal of the tube by breaking it into the drum may interfere with eventual plans for the removal of its contents. The use of this technique should be cleared with the project officer or other disposal techniques evaluated.

## 8.3.2 COLIWASA Sampler

Designs exist for equipment that will collect a sample from the full depth of a drum and maintain it in the transfer tube until delivery to the sample bottle. These designs include primarily the Composite Liquid Waste Sampler (COLIWASA) and modification thereof. The COLIWASA is a much-cited sampler designed to permit representative sampling of multiphase wastes from drums and other containerized wastes. One configuration consists of a 152 cm by 4 cm LD. section of tubing with a neoprene stopper at one end attached by a rod running the length of the tube to a locking mechanism which opens and closes the sampler by raising and lowering the neoprene stopper.

The major drawbacks associated with using a COLIWASA concern decontamination and costs. The sampler is difficult if not impossible to decontaminate in the field and its high cost in relation to alternative procedures (glass tubes) make it an impractical throwaway item. It still has applications, however, especially in instances where a true representation of a multiphase waste is absolutely necessary.

#### Procedures for Use

- 1. Put the sampler in the open position by placing the stopper rod handle in the T-position and pushing the rod down until the handle sits against the sampler's locking block.
- 2. Slowly lower the sampler into the liquid waste. (Lower the sampler at a rate that permits the levels of the liquid inside and outside the sampler tube to be about the same. If the level of the liquid in the sample tube is lower than that outside the sampler, the sampling rate is too fast and will result in a nonrepresentative sample.)
- 3. When the sampler stopper hits the bottom of the waste container, push the sampler tube downward against the stopper to close the sampler. Lock the sampler in the closed position by turning the Thandle until it is upright and one end rests tightly on the locking block.



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- 4. Slowly withdraw the sample from the waste container with one hand, while wiping the sampler tube with a disposable cloth or rag with the other hand.
- 5. Carefully discharge the sample into a suitable sample container by slowly pulling the lower end of the T-handle away from the locking block while the lower end of the sampler is positioned in a sample container.
- 6. Cap the sample container with a Teflon<sup>⊈</sup>-lined cap; attach label and seal; and record on sample data sheet.
- 7. Unscrew the T-handle of the sampler and disengage the locking block. Clean sampler.

## 9.0 QUALITY ASSURANCE/QUALITY CONTROL

The following general quality-assurance procedures apply:

- 1. All data must be documented on standard chain-of-custody forms, field data sheets, or within field/site log books.
- 2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior to sampling/operation, and they must be documented.
- 3. All deliverables will receive peer review prior to release.

The following specific quality assurance activity will apply:

Generally, one duplicate sample is collected for every 10 samples collected. Other duplicates and spikes may be required depending on the particular analytical parameter requested. See the site-specific sampling plan for further QA/QC considerations.

#### 10.0 DATA VALIDATION

The data generated will be reviewed according to the QA/QC considerations included in Section 9.0.

# 11.0 HEALTH AND SAFETY

The opening of closed containers is one of the most hazardous site activities. Maximum efforts should be made to ensure the safety of the sampling team. Proper protective equipment and a general awareness of the possible dangers will minimize the risk inherent to sampling operations. Employing proper drum-opening techniques and equipment will also safeguard personnel. The use of remote sampling equipment whenever feasible is highly recommended.

Most drum sampling activities are performed in level B with additional splash protection. This includes:

Protective coverall (Saran Tyvek PVC, acid suit, etc.)



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Hard hat

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Steel toe, steel shank boot (and latex booties covering steel-toe work boots)

Surgical gloves

Solvent/acid-resistant gloves

Splash apron

Face splash shield

For detailed descriptions of required levels of protection, see EPA/REAC Standard Operating Procedure No. 3012, "Hazardous Waste Site Investigations," and the site-specific safety plan.

# 12.0 REFERENCES

Guidance Document for Cleanup of Surface Tank and Drum Sites, OSHA Directive 9830.0-3

Drum Handling Practices at Hazardous Waste Sites, EPA-600/2-86-013

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#### 1.0 POLICY

Project supervisors must be aware of the symptoms and causes of cold-related illnesses and take appropriate steps to prevent their occurrence.

#### 2.0 PURPOSE

This procedure describes the symptoms, treatment, and/or prevention of cold-related illness.

#### 3.0 SYMPTOMS

When exposed to cold temperature and/or cold water, the body reacts instinctively in a pattern designed to preserve itself. When the brain recognizes any dangerous temperature drop in the body core, it signals the body to make adjustments to compensate for the imbalance. In an attempt to preserve normal temperatures in the vital internal organs, the blood vessels in the extremities constrict (vasoconstriction). This slows the blood flow to the arms and legs, preserving energy and warm blood for the body core. If heat loss continues and the body core temperature drops below 95°F (35°C), the body then tries to generate more heat through shivering, which causes metabolic heat production to increase to several times the normal rate. Shivering is the first real warning sign of hypothermia. Further heat loss, accompanied by a body core temperature drop to 90°F (32.2°C) or below, results in speech difficulty, loss of manual dexterity, slow reactions, mental confusion, and muscle rigidity (muscle hypertonias). If exposure continues until the body's resources are exhausted, and if the cold blood reaches the heart and brain, heart failure and coma will result and inevitably lead to death. Death occurs when the body core temperature falls below 78°F (25.6°).

#### 4.0 COLD-RELATED ILLNESSES

### 4.1 Frostbite

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If exposure occurs in temperatures that are below freezing (30°F or below), frostbite or trench foot (immersion foot) may accompany or complicate the symptoms of hypothermia. Frostbite is the freezing of living tissues with a resultant breakdown of cell structure. Injury due to frostbite may range from superficial redness of the skin, slight numbness, and blisters, to the obstruction of blood flow (ischemia), blood clots (thrombosis), or skin discoloration due to insufficient oxygen in the blood (cyanosis). Frostbite may occur if the skin comes into contact with objects with a surface temperature below freezing, such as metal tool handles. Trench foot is caused by continuous exposure to cold combined with persistent dampness or immersion in water. Injuries in this case include permanent tissue damage due to oxygen deficiency, damage to capillary walls, severe pain, blistering, tissue death, and ulceration. Additionally, cold exposures may either induce or intensify vascular abnormalities. These include chilblain (a swelling or sore), Raynaud's disease, acrocyanosis (blueness of hands and feet) and thromboangiitis (inflammation of the innermost walls of blood vessels with accompanying clot formation). Workers suffering from these ailments should take particular precautions to avoid chilling.

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# 4.2 Hypothermia

Hypothermia damages both the body's internal temperature mechanisms (hypothalamus) and the peripheral mechanisms to prevent heat loss (vasoconstriction and perspiration.) These effects may last up to three years.

#### 5.0 TREATMENT

If hypothermia occurs, certain first aid procedures can mean the difference between life and death for the victim. These include the following (as a general rule, treat all injuries in the order of their importance to preserving life):

## 5.1 For Hypothermia:

- 1. Give artificial respiration and stop any bleeding, if necessary.
- 2. Bring the victim into a warm room or shelter as quickly as possible.
- 3. If the victim cannot be moved (spinal injury, etc.), carefully place newspapers, blankets or some other insulation between the victim and the ground.
- 4. Remove all wet clothing.
- 5. Provide an external heat source since the body cannot generate its own heat. Wrap the victim in prewarmed blankets, place him or her in the liner of a portable hypothermia treatment unit, put the torso (not the extremities) into a tub of warm water or use body-to-body contact to rewarm the body core. These measures will slowly reopen the peripheral circulation, minimizing the possibility of after-shock or after-drop (the flowing of cooled, stagnated blood from the limbs to the heart), which may cause ventricular fibrillation, cardiac arrest, or death.
- 6. Do not allow the victim to sleep.
- 7. Give warm, sweet drinks -- no alcohol or pain relievers.
- 8. Keep the victim still. Do not try to walk.
- 9. Do not rub numb skin.
- 10. Get medical help as soon as possible.



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# 5.2 For Frostbite:

- 1. Wrap the victim in woolen cloth and keep dry until he or she can be brought inside.
- 2. Do not rub, chafe, or manipulate frozen parts.
- 3. Bring the victim indoors.
- 4. Place the victim in warm water (102 to 105 F) and make sure the water remains warm. Test the water by pouring it on the inner surface of your forearm. Never thaw affected body parts if the victim has to go back out into the cold. The affected area may be refrozen.
- 5. Do not use hot water bottles or a heat lamp, and do not place the victim near a hot stove.
- 6. Do not allow the victim to walk if his or her feet are affected.
- 7. Have the victim gently exercise the affected parts once they are thawed.
- 8. Seek medical aid for thawing of serious frostbite; the pain will be intense and tissue damage will be extensive.

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#### 1.0 POLICY

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Each EARTH TECH work site will be identified, categorized, and follow a work procedures program to assure the health and safety of employees who are required to participate in or work around tank excavation and removal. This document will review the associated hazards and safety procedures.

#### 2.0 DEFINITION OF ACTIVITIES

- A. Properly dispose of any liquids or gases remaining in the tank.
- B. Sample and analyze the contents, if any, of the tanks.
- C. Render the atmosphere within the tank inert (atmosphere <10% lower explosive limit and/or oxygen content <5%).

# 3.0 HAZARDS OF TANK CLEANING

- A. Hazardous atmospheres in and around tanks.
- B. Direct inhalation or dermal exposure to hazardous materials.

#### 4.0 SAFETY PROCEDURES

- A. Removal of Liquid and Sludge from Tanks
  - 1. Disconnect or remove sources of ignition from the vicinity of the tank before venting or removal operations start.
  - 2. Personnel conducting the removal operations shall be appropriately protected from harmful exposure to toxic or corrosive vapors or gases.
  - 3. Empty the tank of all liquids, including the removal of liquids from any internal piping.
  - 4. Liquid or residue shall be removed as completely as possible using vacuum systems or pumps prior to tank excavation and removal.
  - 5. Blank or disconnect all piping to the tank.
  - 6. Site personnel shall remain upwind of operations whenever feasible.



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# B. Removal of Flammable Vapors

- 1. Inerting of vapor space shall be performed by a qualified individual thoroughly familiar with the limitations and characteristics of the inerting gas being used.
- 2. Close all openings in the tank with the exception of the filling connection and vent.
- 3. Introduce inerting gas at a point near the bottom of the tank.
- 4. A combustible gas/oxygen meter shall be used to remotely monitor the atmosphere within the tank.

# C. Miscellaneous Toxics

Potential health hazards generated during the cleaning process (e.g., solvents) will be monitored with appropriate sampling media.

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#### 1.0 POLICY

Preventing hearing loss due to excessive workplace noise exposure is a primary objective of EARTH TECH. To achieve this objective, the following policy on hearing conservation has been instituted to comply with 29 CFR 1910.95.

# 2.0 REQUIREMENTS

All employees exposed to 85 dBA time-weighted average (TWA) for eight hours will be included in a Hearing Conservation Program. All employees exposed to 90 dBA (TWA) for eight hours will be required to wear hearing protectors.

#### 3.0 AUDIOMETRIC HEARING TESTS

- 1. Qualified medical personnel will conduct a baseline audiogram on all EARTH TECH personnel who meet the criteria of noise exposure as stated in this policy. Thereafter, annual audiograms will be compared with the baseline exam. All field personnel will receive a baseline audiogram prior to employment.
- 2. The frequencies tested will be 250, 500, 1,000, 2,000, 3,000, 4,000, 6,000, and 8,000 Hz. When not feasible, due to equipment incapability or background ambient noise, 250 Hz and 8,000 Hz may be excluded.
- 3. When a Standard Threshold Shift (STS) is noted between the last valid baseline and the annual audiogram, the following steps will be taken:
  - a. A retest will be conducted within 30 days to confirm the STS. The employee will not be exposed to workplace/hobby noise for 14 hours and/or will be provided with adequate hearing protection prior to testing.
  - b. If the STS persists, ear protection will be upgraded to one with a greater Noise Reduction Rating (NRR).
  - c. The employee will be counseled, and EARTH TECH will obtain information regarding the employee's possible noise exposure away from the workplace or existing ear pathology.
  - d. Qualified medical personnel will review the audiograms. This group will determine the need for a medical referral.
  - e. The employee will be notified in writing by the Industrial Hygiene Department of the STS, within 21 days of determination, as required by OSHA.
  - f. The employee's supervisor will be notified of the shift in hearing threshold.
  - g. If the employee who has experienced an STS is exposed to 85 dBA for 8 hours or 80 dBA for 12 hours, mandatory use of ear protection is required.



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h. Temporary employees will receive audiograms during their exit physicals.

#### 4.0 MONITORING OF NOISE LEVELS

The Health and Safety Officer will monitor personal and environmental noise levels using noise dosimetry to determine the need for employees to be enrolled in the Hearing Conservation Program. EARTH TECH will periodically monitor noise levels during site operations to document personnel exposure levels. EARTH TECH will implement engineering controls will be implemented if boundary noise levels exceed 10 dBA above background levels.

#### 5.0 HEARING PROTECTORS

- A. Hearing protection will be mandatory for all employees exposed to 90 dBA for 8 hours and 85 dBA for 12 hours.
- B. Hearing protectors will be made available to all employees exposed to 85 dBA for 8 hours or greater.
- C. Hearing protection will be mandatory for all employees exposed to 85 dBA for 8 hours and who have experienced an STS.
- D. The Industrial Hygiene Department will fit and initially issue all hearing protection. All employees issued hearing protection will be trained in the proper use, care, and maintenance of the protectors.
- E. EARTH TECH will offer at least three hearing protector devices.
- F. All hearing protection will carry a NRR of at least 26 dBAs and be approved by the Industrial Hygiene Department prior to use in the field.

# 6.0 RETENTION OF RECORDS

- A. Noise exposure measurement records will be retained for three years.
- B. Audiometric test records will be retained for the duration of employment, plus 40 years.
- C. Annual employee training session documentation will be retained for the duration of employment.

#### 7.0 TRAINING PROGRAM

- A. All employees exposed to noise at or above 85 dBA (TWA) for 8 hours, or 80 dBA (TWA) for 12 hours, will participate in an annual training program.
- B. The training program will focus on:
  - The effects of noise:



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- The purpose of hearing protectors, their advantages and disadvantages, and use and care; and
- The purpose and procedure of audiometric testing.

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# ADDITIONAL HEALTH AND SAFETY INFORMATION

# Exposure Control Plan for Bloodborne Pathogens

Prepared by: Farth Tech, Inc. 2229 Tomlynn Street Richmond, Virginia 23230

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#### 1.0 INTRODUCTION

This Exposure Control Plan presents health and safety guidelines for voluntary and designated first aid and card opulmonary resuscitation (CPR) care providers. In order to meet the requirements of Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) & 1910.151, during day shift operations, at least one person on site will be adequately trained in first aid and CPR, in the requirements of the Bloodborne Pathogens Standard as listed in 29 CFR & 1910.1030, and in the contents of this plan.

#### 1.1 Definitions

Bloodborne pathogens are those agents (i.e., bacteria, virus, fungi) found in blood, blood components, certain body fluids, and other materials, objects, or surfaces that have had contact with blood that are capable of causing human disease or death to unprotected people who came into contact with blood or blood-affected items. Diseases caused by bloodborne pathogens include, but are not limited to, hepatitis B virus (HBV), human immunodeficiency virus (HIV), hepatitis C, malaria, and syphilis. The most significant and of greatest concern are HBV and HIV.

#### 1.1.1 Hepatitis B Virus

HBV is the major bloodborne pathogen hazard that first aid/CPR care providers are more likely to encounter. The HBV can remain infectious for up to 10 days even in dried blood. The virus adversely affects 8,000 to 10,000 workers annually resulting in approximately 200 deaths each year.

## 1.1.1.1 Hepatitis Exposure Symptoms

Hepatitis means "inflammation of the liver" causing severe liver damage or cirrhosis. Exposure symptoms include fever, fatigue, nausea, vomiting, muscle aches, loss of appetite, and jaundice (yellowing of the eyes or skin). Hepatitis diagnosis is difficult because some symptoms are similar to the flu and may remain mild for an extended period of time.

Presently, no cure exists for hepatitis, but it can be prevented with a vaccination.

#### 1.1.2 Human Immunodeficiency Virus

HIV attacks and deteriorates the body's immune system and eventually weakens it to the point that infection set in causing the disease Acquired Immune Deficiency Syndrome (AIDS). HIV is primarily transmitted through sexual contact, but may also be transmitted through contact with blood and body fluids. HIV is not transmitted by touching or working with people who are HIV-positive.

### 1.1.2.1 Human Immunodeficiency Virus Exposure Symptoms

HIV leads to AIDS-related illnesses which eventually cause neurological problems, cancer, pneumonia, and death. People carry the virus for many years of their lives without experiencing any symptoms. Upon development, symptoms may include weight loss, skin lesions, dry cough, fever, fatigue, diarrhea, or swelling of the lymph glands.

Presently, no cure exists for HIV or AIDS and no vaccination is currently available.

# 1.2 Exposure Determination

The guidelines in this plan are designed to limit occupational exposure of site workers to infectious blood materials which could result in disease and possible death. The contents of this plan are intended to protect the Earth Tech employees trained in first aid and CPR who are responsible for administering medical assistance to site workers.

#### 1.2.1 Means of Transmission

The major activity that may expose any of these Earth Tech employees to bloodborne pathogens is their response to and care of on-site personal injuries or decontamination of equipment/surfaces contaminated by blood or other potentially infectious materials during the incident.

These Earth Tech employees could be subject to bloodborne pathogens during rendering of first aid or CPR by accidental exposure due to:

- Punctures through the skin with a contaminated sharp object (e.g., scissors)
- Contact or absorption of blood or blood-contaminated objects through open or broken skin (e.g., cuts, scratches, rashes)
- Blood splashes to their eyes, nose, or mouth or other mucous membranes.

Workers can reduce their risk of contacting HBV or HIV by implementing the work practices outlined in this plan before, during, and after responding to emergency medical incidents involving personal injuries.

### 1.3 Measure of Prevention

The establishment of work practices controls is an integral part of an effective exposure control plan in preventing accidental infection of employees. These work practices are designed to protect employees from reasonably foreseeable occupational exposures to bloodborne pathogens from blood and other potentially infectious material. The work practice controls outlined in this section are applicable to the administration of first aid in emergency situations and subsequent cleanup only.

#### 1.3.1 Universal Precautions

Universal precautions is an approach to infection control which operates on the assumption that all human blood and bodily fluids are to be treated as if they are known to be contaminated with HIV, HBV, or other infectious diseases. Universal precautions shall be implemented whenever there exists a foreseeable potential for contact with blood or bodily fluids.

#### 1.3.2 Engineering Controls

Due to the remote location of the worksite, the nature of work in outdoor locations with potential exposure to airborne chemical contaminants, and the potential for exposure being limited to emergency situations, the implementation of engineering controls is not feasible. Exposure control shall be accomplished through implementation of work practice controls and use of personal protective equipment.

#### 1.3.3 Work Practice Controls

Work practice controls shall be instituted whenever foreseeable potential contact with, or exposure to, blood and bodily fluid exists. Examples of situations in which these controls are to be implemented include, but are not limited to, accidents or injuries in which administration of first aid is required, application of bandages to minor cuts and abrasions of another person, and contact with sores, wounds, or broken skin.

Following are specific work practice controls that shall be implemented:

- Open wounds or cuts will be promptly bandaged.
- Wash hands and face as soon as possible after administering first aid or CPR. If wash facilities are not readily available, stock disposable one-time use towelettes.
- No eating, drinking, or smoking is allowed in any work area where a potential exists for occupational exposure to blood borne pathogens.
- Non-disposable equipment or materials that have or may have blood or infectious fluid contact must be washed immediately after their use. (A 1-to-10 solution of bleach and water is recommended for proper decontamination.)
- Any clothing that becomes contacted with blood or infectious fluids shall be removed as soon as possible after administering first aid or CPR.
- No personal clothing that becomes contacted with blood or infectious fluids shall be laundered off-site.
- Ensure that first-aid kits on-site are equipped with a pair of surgical gloves and CPR mouth pieces.

#### 1.3.3.1 Minimization of Contact

Direct contact with blood and bodily fluids should be kept to an absolute minimum, as required in a particular situation. In situations where direct contact is likely, personal protective equipment shall be worn to help prevent infection.

Based upon professional judgment, an employee may choose to temporarily forego the use of PPE if he determines that the use of PPE will further jeopardize his well-being or that of the injured worker. This limited application must be carefully evaluated by the employee.

If this does occur, Earth Tech is obligated to investigate and document the circumstances in an effort to provide alternative means to avoid further occurrence.

#### 1.3.4 Personal Protective Equipment

The following are specific personal protective equipment items that shall be implemented:

- Always wear hand (i.e. latex or nitrile surgical gloves) and eye (i.e. safety glasses, goggles) protection to administer or apply first aid or CPR.
- Full-body protective clothing (Saranex)
- Respirators [full-face, air-purifying respirators (APRs) with MSA GMC-H cartridges will be worn if the potential for airborne mists/vapors/particulates are generated during bloodborne pathogen cleanup]

# 1.3.5 Waste Handling and Disposal

The only documented occupational risks of HIV and HBV infection are associated with parenteral (including open wound) and mucous membrane exposure to blood and other potentially infectious body fluids. Nevertheless, the precautions described below should be routinely followed.

## 1. Needle and sharps disposal

All workers should take precautions to prevent injuries caused by needles, scalpel blades, and other sharp instruments or devices during procedures; when cleaning used instruments; during disposal of used needles; and when handling sharp instruments after procedures. To prevent needle-stick injuries, needles should not be recapped, purposely bent or broken by hand, removed from disposable syringes, or otherwise manipulated by hand. After they are used, disposable syringes and needles, scalpel blades, and other sharp items should be placed in puncture-resistant containers for disposal; the puncture-resistant containers should be located as close as practical to the use area (e.g., in the use area or, if sharps are carried to the scene of victim assistance from the ambulance, a small, puncture-resistant container also should be carried to the scene). Reusable needles should be left on the syringe body and should be place in the puncture-resistant container for transport to the reprocessing area.

## 2. Hand washing

Hands and other skin surfaces should be washed immediately and thoroughly if contaminated with blood, other body fluids to which universal precautions apply, or potentially contaminated articles. Hands should always be washed after gloves are removed, even if the gloves appear to be intact. Hand washing should be completed using the appropriate facilities, such as utility or restroom sinks. Waterless antiseptic hand cleanser should be provided on responding units to use when handwashing facilities are not available. When hand-washing facilities are available, wash hands with warm water and soap; when they are not, use waterless antiseptic hand cleanser. The manufacturer's recommendations for the product should be followed.

#### 3. Cleaning, disinfecting, and sterilizing

Table 3 in Appendix 1 presents the methods and applications for cleaning, disinfecting, and sterilizing equipment and surfaces in the pre-hospital setting. These methods also apply to housekeeping and other cleaning tasks.

# 4. Cleaning and decontaminating spills of blood

All spills of blood and blood-contaminated fluids should be promptly cleaned up using and EPA-approved germicide or a 1:1000 solution of household bleach in the following manner, while wearing gloves. Visible material should first be removed with disposable towels or other appropriate means that will ensure against direct contact with blood. If splashing is anticipated, protective eyewear should be worn along with an impervious gown or apron which provides an effective barrier to splashes. The area should then be decontaminated with an appropriate germicide. Hands should be washed following removal of gloves. Soiled cleaning equipment should be cleaned and decontaminated or placed in an appropriate container and disposed of according to agency policy. Plastic bags should be available for removal of contaminated items from the site of the spill.

Shoes and boots can become contaminated with blood in certain instances. Where there is massive blood contamination on floors, the use of disposable impervious shoe coverings should be considered. Protective gloves should be worn to remove contaminated shoe coverings. The coverings and gloves should be disposed of in plastic bags. A plastic bag should be included in the first-aid kit or vehicle to be used for the disposal of contaminated items. Extra plastic bags should be stored in the emergency vehicle.

# 5. Laundry

Although soiled linen may be contaminated with pathogenic microorganisms, the risk of actual disease transmission is negligible. Rather than rigid procedures and specifications, hygienic storage and processing of clean and soiled linen are recommended. Laundry facilities and/or services should be made routinely available by the employer. Soiled linen should be handled as little as possible and with minimum agitation to prevent gross microbial contamination of the air and of persons handling the linen. All soiled linen should be bagged at the location where it was used. Linen soiled with blood should be place and transported in bags that prevent leakage. Normal laundry cycles should be used according to the washer and detergent manufacturer's recommendations.

# 6. Decontamination and laundering of protective clothing

Protective work clothing contaminated with blood or other body fluids to which universal precautions apply should be place and transported in bags or containers that prevent leakage. Personnel involved in the bagging, transport, and laundering of contaminated clothing should wear gloves. Protective clothing and station and work uniforms should be washed and dried according to the manufacturer's instructions. Boots and leather goods may be brush-scrubbed with soap and hot water to remove contamination.

#### 7. Infective waste

The selection of procedures for disposal of infective waste is determined by the relative risk of disease transmission and application of local regulations, which vary widely. In all cases, local regulations should be consulted prior to disposal procedures, and followed. Infective waste, in general, should either be incinerated or should be decontaminated before disposal in a sanitary landfill. Bulk blood, suctioned fluids, excretions, and secretions may be carefully poured down a drain connected to a sanitary sewer, where permitted. Sanitary sewers may also be used to dispose of other infections wastes capable of being ground and flushed into the sewer, where permitted. Sharp items should be placed in puncture-proof containers and

other blood-contaminated items should be placed in leak-proof plastic bags for transport to an appropriate disposal location.

Prior to the removal of protective equipment, personnel remaining on the scent after the patient has been cared for should carefully search and remove contaminated materials. Debris should be disposed of as noted above.

# 1.4 Medical Requirements

#### 1.4.1 HBV Vaccination

All workers whose jobs involve participation in tasks or activities with exposure to blood or other body fluids to which universal precautions apply (as defined above) should be vaccinated with HBV vaccine.

#### 1.4.2 Post-Exposure Management

Once an exposure has occurred, a blood sample should be drawn after consent is obtained from the individual from whom exposure occurred and tested for hepatitis B surface antigen (HBsAg) and antibody to HIV. Local laws regarding consent for testing source individuals should be followed. Policies should be available for testing source individuals in situations where consent cannot be obtained (e.g., and unconscious patient). Testing of the source individual should be done at a location where appropriate pre-test counseling is available; post-test counseling and referral for treatment should be provided. It is extremely important that all individuals who seek consultation for any HIV-related concerns received counseling as outlined in the *Public Health Service Guidelines for Counseling and Antibody Testing to Prevent HIV Infection and AIDs*.

• HBV Post-Exposure Management: For an exposure to a source individual found to be positive for HBV or HBsAg, the worker who has not previously been given hepatitis B vaccine should receive the vaccine series. A single dose of hepatitis B immune globulin (HBIG) is also recommended, if this can be given within seven days of exposure. For exposures from an HBV-positive source to workers who have previously received the vaccine, the exposed worker should be tested for antibody to hepatitis B surface antigen (anti-HBs) and given one dose of vaccine and one dose of HBIG if the antibody level in the worker's blood sample is inadequate.

If the source individual is negative for HBV/HBsAg and the worker has not been vaccinated, this opportunity should be taken to provide hepatitis B vaccination.

If the source individual refuses testing or he/she cannot be identified, the unvaccinated worker should receive the hepatitis B vaccine series. HBIG administration should be considered on an individual basis when the source individual is known or suspected to be at high risk of HBV infection. Management and treatment, if any, of previously vaccinated workers who receive an exposure from a source who refuses testing or is not identifiable should be treated on a case-by-case basis.

HIV Post-Exposure Management: For any exposure to a source individual who has AIDS, who is found to be positive for HIV infection, or who refuses testing, the worker should be counseled regarding the risk of infection and evaluated clinically and serologically for evident of HIV infection as soon as possible after the exposure. In view of the evolving nature of HIV post-exposure management, the health-care provider should be well-informed

of current U.S. Public Health Service (PHS) guidelines on this subject. The worker should be advised to report and seek medical evaluation for any acute febrile illness that occurs within 12 weeks after the exposure. Such an illness, particularly one characterized by fever, rash, or lymphadenopathy, may be indicative of recent HIV infection. Following the initial test at the time of exposure, seronegative workers should be retested six weeks, 12 weeks, and six months after exposure to determine whether transmission has occurred. During this follow-up period (especially the first six to 12 weeks after exposure, when most infected persons are expected to seroconvert), exposed workers should follow PHS recommendations for preventing transmission of HIV. These include refraining from blood donation and using appropriate protection during sexual intercourse. During all phases of follow-up, it is vital that worker confidentiality be protected.

If the source individual was tested and found to be seronegative, baseline testing of the exposed worker with follow-up testing 12 weeks later may be performed if desired by the worker or recommended by a health-care provider.

If the source individual cannot be identified, decisions regarding appropriate follow-up should be made on a case-by-case basis. Serologic testing should be made available by the employer to all workers who may be concerned that they have been infected with HIV through an occupational exposure as defined above.

#### 1.4.2 Post-Exposure Procedures and Evaluation

Subsequent to all reported exposure incidents, a confidential medical evaluation and follow-up shall be made available to each employee exposed in the incidents.

#### 1.4.2.1 Documentation Procedures

Documentation of the exposure incident shall be recorded as soon as possible, and include the route(s) of exposure, the circumstances surrounding the incident, and the identification of the source individual. Additionally, each incident involving voluntary first aid providers shall be placed on the "first aid incident list" attached to the location OSHA Log of Occupational Injuries and Illnesses.

#### 1.4.2.2 Blood Testing

Based upon the known and anticipated site contaminants, blood testing is not required for this project.

#### 1.4.2.2.1 Source Individuals

As soon as feasible, the source individual in an exposure incident will be asked to consent to a blood test to determine HBV and HIV infectivity. Where applicable laws require employee consent, documented consent shall be obtained prior to testing. If an employee refuses the blood test, documentation of the refusal will be made. Documentation of the test results shall be made available to the exposed employee(s). All results should be kept confidential, as criminal and civil penalties may be charged against persons negligently or willfully releasing such information, depending on local laws.

#### 1.4.2.2.2 Exposed Employees

Exposed employees will be asked to consent to a blood test for HBV and HIV serological status. If consent to HIV testing is denied, the blood sample will be preserved for 90 days, within such time the employee may elect to consent to the HIV test.

#### 1.4.3 Post-Exposure Medical Evaluations

Exposed employees shall receive a healthcare professional's written opinion for post-exposure evaluations. The written opinion shall include the results of the evaluation and any medical conditions resulting from the exposure incident which requires further medical treatment.

#### 1.5 Hazard Communication

#### 1.5.1 Warning Labels

Containers used for disposal of blood contaminated supplies and waste will be labeled in accordance with the word "biohazard."

#### 1.5.2 Warning Signs

There are no designated areas for medical treatment on site, since first aid will be provided on an emergence basis only, and therefore warning signs are not applicable. In cases of potential exposure observers and non essential personnel should be verbally warned to keep a safe distance from injured personnel.

#### 1.5.3 Employee Training Program - Voluntary Providers

All associates who are first aid/CPR trained and may provide assistance shall be trained in the requirements for voluntary providers as described in this HASP, and the general provisions of Earth Tech's procedures.

#### 1.5.4 Employee Training Program - Designated Providers

Employee training will be provided at the time of initial assignment and annually thereafter. Additional training will be given as changes in or modification to procedures occur.

The training program includes the following elements:

- A copy of 29 CFR 1910.1030 for review
- Explanations of epidemiology of bloodborne diseases, modes of transport, symptoms of infection
- Explanation of the exposure control plan, methods used to recognize tasks with potential exposure
- Explanations of use and limitations of control measures

- Information on the Hepatitis B vaccination, medical evaluation, post-exposure follow-up
- Explanation of warning signs and labels.

#### 1.6 Recordkeeping

#### 1.6.1 Training Records

All employees selected to attend the training program that covers the contents of this plan shall sign the Acknowledgment Form and the Training Attendance Form.

The training record will contain the date; training outline; name and qualifications of the trainer, and names and job titles of attendees.

At the completion of the training program, all participants must take and pass the training quiz.

The training records will be maintained by the Earth Tech Training Department for at least three years from the training date.

#### 1.6.2 Medical Records

Medical records necessary for Earth Tech employees must include documentation on HBV vaccination status, medical follow-up, post-exposure testing, and a medical professional's written evaluation.

#### 1.6.2.1 Confidentiality

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The employee medical records will be forwarded to EMR for inclusion in the employee's medical file.

#### 1.6.2.2 Maintenance and Transfer of Records

Earth Tech shall maintain the employee medical records for the duration of the employee's employment plus 30 years thereafter.

If, for wharever reason, Earth Tech no longer does business and no successor exists, the will notify the Director of NIOSH in writing three months prior to the disposal of records. If so directed, the records shall be transferred to the Director of NIOSH.

#### 1.6.3 Incident Recording

An incident the occurs as a result of rendering emergence medical care will be recorded on the OSHA 200 log as OSHA defines work-related injuries and illnesses.

# JOB SAFETY & HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Provisions of the Act include the following:

#### **Employers**

At employers must furnish to employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupation at safety and health standards issued under the Act.

#### **Employees**

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct jobsite inspections to help ensure compliance with the Act.

#### Inspection

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

#### Complaint

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discriminatory action.

#### Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warr employees of dangers that may exist there.

#### **Proposed Penalty**

The Act provides for mandatory civil penalties against employers of up to \$7,000 for each serious violation and for optional penalties of up to \$7,000 for each nonserious violation. Penalties of up to \$7,000 per day may be proposed for failure to correct violations within the proposed time period and for each day the violation continues beyond the prescribed abatement date. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to \$70,000 for each such violation. A violation of posting requirements can bring a penalty of up to \$7,000.

There are also provisions for criminal penalties. Any willful violation resulting in the death of any employee, upon conviction, is punishable by a fine of up to \$250,000 (or \$500,000 if the employer is a corporation), or by imprisonment for up to six months, or both. A second conviction of an employer doubles the possible term of imprisonment. Falsifying records, reports, or applications is punishable by a fine of \$10,000 or up to six months in jail or both.

#### **Voluntary Activity**

While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

OSHA has published Safety and Health Program Management Guidelines to assist employers in establishing or perfecting programs to prevent or control employee exposure to workplace hazards. There are many public and private organizations that can provide information and assistance in this effort, if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for help such as training.

#### Consultation

Free assistance in identifying and correcting hazards and in Improving safety and health management is available to employers, without citation or penalty, through OSHA-supported programs in each State. These programs are usually administered by the State Labor or Health department or a State university.

#### **Posting Instructions**

Employers in States operating OSHA approved State Plans should obtain and post the State's equivalent poster.

Under provisions of Title 29, Code of Federal Regulations, Part 1903.2(a)(1) employers must post this notice (or facsimile) in a conspicuous place where notices to employees are customarily posted.

#### More Information

Additional ir formation and copies of the Act, OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA Regional Office in the following locations:

Atlanta, GA (404) 562-2300 Boston, MA (617) 565-9860 Chicago, IL (312) 353-2220 Dallas, TX (214) 767-4731 (303) 844-1600 Denver, CO (816) 426-5861 Kansas City, MO (212) 337-2378 New York, NY Philadelphia, PA (215) 596-1201 (415) 975-4310 San Francisco, CA Seattle, WA (206) 553-5930

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Alexis M. Herman, Secretary of Labor

### U.S. Department of Labor

Occupational Safety and Health Administration



Washington, DC

1997 (Reprinted)

**OSHA 2203** 

This information will be made available to sensory impaired individuals upon request. Voice phone: (202) 219-8615; TDD message referral phore: 1-800-326-2577

#### APPENDIX B

## HAZWOPER CERTIFICATES

NAME	MEDICAL	8-HOUR REFRESHER	FIT TEST	CONFINED SPACE	ASBESTOS ABATEMENT WORKER	ASBESTOS CONTRACTOR SUPERVISOR	FIRST AID	<u>CPR</u>
Brooks, Michael	2/17/00	2/19/00	7/28/00					
Brown, Shane	12/6/99	12/3/99	12/2/99					
Bryant, Randy	5/16/00	5/5/00	8/10/00	6/5/98	-			
Caine, Jack	8/25/00	9/15/00	9/19/00					
Cook, Tom	2/28/00	2/28/00	2/28/00		_			
Fowler, Brandy	5/1/00	5/19/00	5/8/00					
Goodman, Andrew	3/21/00	5/1/00	5/8/00					
Gross, Mike	7/18/00	7/27/00	7/26/00	7/28/00	8/3/00			
Hudnall, James	4/25/00	3/30/00	4/30/00					
Keegan, Charlie	11/23/99	2/24/00	1/5/99					
McKinney, Shane	10/22/99	2/9/00	11/5/99					
Merriman, Jim	5/31/00	5/11/00	5/10/00					
Olive, Joel	2/28/00	3/10/00	3/17/00					
Oxedine, Kachina	7/7/00	12/3/99	1/25/00				3/1/00	3/1/00
Partilla, Ronald	8/14/00	3/18/00	12/8/99					
Pearce, Drew	12/20/99	2/9/00	2/11/00					
Peters, Forest	Not Cleared	9/15/00						
Priore, Charles	8/9/00	8/25/00	8/25/00					
Robinson, Jim	3/17/00	5/5/00	2/1/00					
Robinson, William	5/17/00	5/5/00	1/25/00		8/3/00		4/27/98	4/27/98
Sherron, Michael	8/15/00	7/14/00	9/16/00					
Starling, Ken	1/24/00	1/18/00	1/18/00				2/15/00	2/15/00
Thomas, Robert Fred	6/18/99	8/24/99	3/3/00					
Tuttle, John	5/16/00	5/10/00	6/12/00		8/3/00	1/8/99		

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# 111 Pages Removed Non-Responsive

#### APPENDIX C

# HAZARD COMMUNICATION PROGRAM

#### EARTH TECH HAZARD COMMUNICATION PROGRAM

#### **SECTION**

- Α.. Introduction
- В. Hazard Communication Program
- С. Employee Notification Procedure for Hazardous Materials
- D. Education (Training)
- Hazardous Chemical/Substance Labeling E.
- F. Material Safety Data Sheets (MSDSs)
- **C**-. Contractor/Sub-contractor Notification
- H. Acquisition and Deletion of Materials
- I. **Exhibits**

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- Training Record Labeling 1.
- 2.
- 3. Contractor Notification Form

# EARTH TECH HAZARD COMMUNICATION PROGRAM

#### A. INTRODUCTION

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November 25, 1983, the Federal Hazards Communications Regulation was promulgated as law. The regulation is very complex in comparison to many regulations promulgated prior to 1983.

This regulation, unlike the majority, deals with the physical and health hazards associated with hazardous substances used in the workplace. The major thrust of the regulation deals with the employee's "Right To Know" concerning hazards associated with materials in their workplace.

The impact of this regulation has a far-reaching impact. Most important is the assurance that each employee of Earth Tech is knowledgeable of hazards they may be exposed to under any foreseeable condition. First, we will make every effort possible to ensure such knowledge is made available and second, failure to comply could result in an employee being injured, which cannot be tolerated.

In order to protect employees and company assets from unwanted liabilities, it is imperative the contained program be followed by all personnel of Earth Tech.

Responsibility for coordination of the program is through the Company HSM. This function is responsible for continual monitoring and maintenance of the program. Any questions concerning the program should be addressed to that office. Integration of the program into the various site operations is the responsibility of the area and site managers.

#### B. HAZARD COMMUNICATION PROGRAM - CORPORATE POLICY

#### Background

The federal Government passed the final Hazard Communication Regulation November 25, 1983 with the compliance date for industry being May 25, 1986.

The purpose of this regulation is to place information in the hands of companies and their employees relative to hazardous materials they purchase and work with.

#### Purpose

The purpose of this program is to ensure that all employees (including seasonal and part-time) of Earth Tech and outside contractors working within the facilities of the company, are aware and knowledgeable of the hazards they may be exposed to or work with.

#### Program

1. Hazard Identification - Materials used in all facilities will be reviewed to determine if hazardous ingredients exist solely or in combination with other components. All new materials entering the facilities must be accompanied or preceded with a valid material safety data sheet (MSDS).

2. Container Labeling - Each container of material entering any of the facilities must be properly labeled by the manufacturer or supplier. Such labeling should include material name, a description of associated hazards (physical and health hazards), first-aid measures, personal protective equipment and emergency phone numbers.

Any container received without proper labeling cannot enter the site until properly labeled.

- 3. Material Safety Data Sheets (MSDSs) All hazardous materials must be a MSDS furnished by either the supplier and/or received without proper information requires immediate contact with the supplier or manufacturer to request necessary information. MSDSs must be maintained in an orderly fashion and be available for any employee to read.
- 4. *Posters* Posters will be posted as required per state-specific programs. These posters must be posted and available to all employees.
- 5. *Pipe/Vessel Labeling* Pipes or piping systems and vessels containing hazardous materials must be labeled. The responsibility for proper labeling is vested in the RM.
- 6. Employee Information and Training Programs Will be conducted regarding:
  - a. Requirements of the regulation,
  - b. Hazardous chemical or materials in the work area,
  - c. Location of the written Hazards Communication Program,
  - d. Methods of detecting the presence or release of a hazardous material,
  - e. Physical and health hazards of chemicals or materials,
  - f. Measures employees can take to protect themselves from chemical hazards.
  - g. Explanation of container labels, and
  - h. Explanation of the material safety data sheet (MSDS) and how to read and understand them.
- 7. Contractor Notification In the event outside contractors' employees are working in the facilities, the SSO and/or RM is responsible for informing the contractor of any associated hazards their employees may be exposed to (see enclosures). Additionally, any materials being brought into any of the facilities requires the contractor to furnish MSDSs to the SSO or RM prior to bringing the material(s) on the site.
- 8. Earth Tech Assumes no responsibility for evaluation of chemical hazards associated with products (either purchased or on trial). The Company will rely on such evaluations being completed by the material manufacturer or supplier. Additionally, the Company assumes no responsibility for information contained on MSDSs either in content, accuracy or format of the MSDS.
- 9. Acquisition of Materials Requires the determination of potential hazards. All new materials acquired, either production or trial, require evaluation before introduction into the sites. The determination is made via the MSDS and it must be requested at the time facilities ordering a new product or before a trail material is received.
- 10. Deletion of Materials Requires notification of the SSO or RM. The MSDS <u>must not be</u> destroyed! Any MSDS associated with a deleted material requires the MSDS to be

marked as obsolete and the date it was obsolete. The MSDS should then be placed in an inactive file and retained indefinitely, See Section I of this Hazard Communication.

#### C. EMPLOYEE NOTIFICATION PROCEDURE FOR HAZARDOUS MATERIALS

federal and state regulations require notification and education of all employees working with or around hazardous materials. The following procedure for such notification and education is mandatory.

#### Notification

Employees at all facilities of **Earth Tech** with potential of exposure to hazardous chemicals or materials must receive proper education and training prior to working in any of the site facilities. This notification includes any seasonal or part-time staff members hired to perform work on Company projects as well.

Employees transferring into other facilities and having received initial educational information are required to be notified of the hazards associated with their new work environment.

Employees assigned to <u>non-routine</u> tasks, i.e., vessel cleaning, confined space or specific maintenance work will be advised of those associated hazards via training specific to the need and may include:

- a. Health and/or Safety regulatory training, and/or
- b. U.S. EPA or state sponsored training

#### The initial training will include:

- 1 An overview of the requirements contained in the Hazard Communication Regulation;
- 2. Location and availability of the material safety data sheet (MSDS) files, hazardous chemical list, and the Company's written Hazard Communication Program;
- 3. Physical and health effects of hazardous chemicals;
- 4. Methods and observation techniques used to determine the presence or release of hazardous chemicals in the work area;
- 5. How to lessen or prevent exposure to these hazardous chemicals through usage of control equipment, work practices, and personal protective equipment;
- 6. Steps the Company has taken to lessen or prevent exposure to these chemicals;
- 7 Emergency procedures to follow in the event of a release of a chemical; and
- 8 How to read labels and MSDSs, understand the same, and obtain appropriate hazard information.

Each site indicating those employees who have completed the training will maintain a log.

Each employee receiving training will be required to acknowledge such training by their signature on the **Employee Training Record Form** (see Exhibit 1, Section J).

#### Hazards Of Non-Routine Tasks

Operations involving non-routine tasks where employee exposure(s) are existing, or potential, will be evaluated prior to the non-routine tasks. If evaluations indicate exposures above published permissible exposure limits (PELs), the following actions will be required before the non-routine task begins:

- a. Engineering controls or,
- b. Personal protective equipment

#### Responsibility

Administration of the Hazard Communication Program is the responsibility of the Earth Tech Program Manager. This function shall coordinate and monitor the overall program. Individual area and site managers are responsible for coordination and implementation of this program at the site level.

#### D. EDUCATION (TRAINING)

All employees (including seasonal and part-time) shall be trained regarding hazardous materials:

- 1. At time of initial hiring;
- 2. Whenever a new hazardous material is introduced into the work environment; and
- 3. When refresher training is deemed appropriate by the area manager, site manager, or the employee's supervisor.

The initial training will include:

- 1. An overview of the requirements contained in the Hazard Communication Regulation;
- 2. Location and availability of the material safety data sheet (MSDS) files, hazardous chemical list, and the Company's written Hazard Communication Program;
- 3. Physical and health effects of hazardous chemicals;
- 4. Methods and observation techniques used to determine the presence or release of hazardous chemicals in the work area;
- 5. How to lessen or prevent exposure to these hazardous chemicals through usage of control equipment, work practices, and personal protective equipment;
- 6. Steps the Company has taken to lessen or prevent exposure to these chemicals;
- 7. Emergency procedures to follow in the event of a release of a chemical; and

8. How to read labels and MSDSs, understand the same, and obtain appropriate hazard information.

A file of all employees trained on the project will be maintained at each site.

Each employee receiving training will acknowledge such training via their signature on the Employee Training Record Form (see Exhibit 1, Section J).

Comp eted, Employee Training Record Forms, shall be kept on file in the Employee Safety and Training Record Book, located near the MSDS station.

#### E. HAZARDOUS CHEMICAL/SUBSTANCE LABELING

All incoming materials must be labeled by the site where they are received.

#### **Labeling Procedure**

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The evaluation requires the site receiving the material to:

- 1 Review the Material Safety Data Sheet book and/or inventory printout and determine the proper MSDS number for the received material.
- 2. Affix an HMIS Identification Label to each container (see Exhibit 2 and Exhibit 6 Section J) and enter; (Labels are located near MSDS station).
  - a. MSDS number in the white portion of the label,
  - b. Health, fire and reactivity numbers in the appropriate area of the label, and Personal protective equipment code in the appropriate space.

Once the proper labeling is affixed, the containers(s) may be placed on site.

All hazardous chemical substance labels shall have the MSDS number and hazard ratings affixed. In the event a site eliminates a material, the SSO or RM must be notified so the material safety data sheet (MSDS) may be deleted from the active file.

Labeling of containers is mandatory if the container is used by other than the person transferring the material or, if the container and contents will be used beyond one shift.

A. "container" is defined as anything holding hazardous chemicals or substances. This may include pipe and piping systems.

# EARTH TECH INTERNAL CONTAINER LABELING SYSTEM

A system is incorporated company-wide which provides a simple means for the employee to quickly identify the associated hazards of material in a labeled container.

This identification system incorporates the Hazardous Materials Information System (HMIS) label. The label consists of a rectangular shape which is divided into the following sections:

BLUE	····	Health Hazard,
RED		Fire Hazard,
YELLOW		Reactivity Hazard, and
WHITE	·····	PPE Required

Additionally, this labeling system incorporates a numerical system for identification of the degree of hazard as follows:

0		Minimal hazard
1		Slight hazard
2	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Moderate hazard
3	·····	Serious hazard
4	<del></del>	Severe hazard

Earth Tech has incorporated another item to assist the employee with location of material safety data sheets. All material safety data sheets have a numerical number assigned which is placed at the top of the HMIS label.

The material safety data sheets are maintained by materials used on site and are maintained by the SSO and/or RM. The employee needs to only look up the MSDS to obtain more information about the contents of the container.

#### F. MATERIAL SAFETY & DATA SHEETS (MSDSs)

Each site is required to acquire and place in an orderly fashion, a material safety data sheet (MSDS) for each material classified as or containing "hazardous substances". The sheets are kept in numerical order in a three (3) ring binder which is labeled "Material Safety Data Sheets" and placed so the binder and sheets are available to any employee at any time.

The MSDSs are acquired from the manufacturer or supplier of the product. Acquisition of the MSDSs is the responsibility of the SSO or RM.

This site has established an alphabetical file system for MSDS. The MSDS are filed using their common names alphabetically.

The number assigned to the individual MSDS will be used in conjunction with the internal HMIS labeling system by placing the MSDS number in the top portion of the MSDS label. When a material is no longer used (obsolete material) at the site, the appropriate MSDS must be marked as obsolete. The number that is assigned to the obsolete MSDS must be retired.

Each employee will be taught how to read an MSDS and find necessary information on the sheet.

#### G. CONTRACTOR/SUB-CONTRACTOR NOTIFICATION

federal and/or state regulations require that contractors/sub-contractors be notified of areas they or their people will be working which contain hazardous substances. This notification includes information about protective measures to be taken and allows the opportunity for review of any MSDSs.

Notification must be made prior to beginning contracted work. The RM is responsible for the notification. Notification may be verbal but requires the completion and signing of the Contractor/subcontractor Notification form that they have been informed of the chemical hazards (see Exhibit 3, Section J). This signed statement must be retained as permanent record in the event regulatory officials request review of the documents. Additionally, a signed copy of the completed document should be given to all contractors.

Contractors working within all facilities of Earth Tech and using materials which are, or contain, hazardous substances (as defined within the Hazard Communication Regulation 1910.1200) are required to:

- 1. Give advanced notice to the proper site management of the materials they will use, where used, and where stored; and
- 2. Provide information (Materials Safety Data Sheets and labels) for those substances classified as hazardous substances.

Site personal acquiring the contractors are responsible for obtaining and reviewing information required in items 1 and 2.

If there are hazards associated with the materials, it is the responsibility of site management to inform employees of the hazards and precautionary measures to be taken and to provide an MSDS for employee review.

In the event there are questions regarding potential health or physical hazards associated with materials, the Company Program Manager should be contacted for direction.

#### H. ACQUISITION AND DELETION OF MATERIALS

#### **Acquisition of Materials**

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Any material received for production use or trial cannot enter a site without an MSDS or label. In the event a material is received by a site and it cannot be identified, the RM should contact the supplier and/or manufacturer and request an MSDS immediately. If the supplier or manufacturer does not comply with the request, the Company Program Manager should be contacted for direction.

Any material received by truck without proper paperwork, including an MSDS, cannot be received until the proper paperwork is available.

**Deletion of Materials** 

Any material deleted from a site requires that the existing material safety data sheet be marked as obsolete and the date it was removed from the facilities written on the sheet. Remove the obsolete MSDS from the active MSDS book and place it in an "inactive" file.

NOTE: Do not throw away any original MSDSs or updates. These documents may be considered Medical Records - retain for 30 years.

#### I. EXHIBITS

See the following pages for exhibits 1 through 3.

#### EXHIBIT 1

# EARTH TECH EMPLOYEE EDUCATION & TRAINING RECORD HAZARD COMMUNICATION PROGRAM

NAM	E: <b>DATE:</b>		
SITE	LOCATION:		
	s date I attended a Hazard Communication Training Program at the above site location of Fech. The following topics were taught:		
1.	An overview of the requirements contained in the federal/ state Hazard Communication Standard (Right To Know).		
2.	Location and availability of Material Safety Data Sheets (MSDSs), the Company's written Hazard Communication Program, and the list of hazardous substances found on this site.		
3.	Physical and health hazards associated with the materials I may be exposed to or work		
with.			
4.	Methods and observation techniques I can use to determine the presence or release of a hazardous substance. This included:		
	a. Smell (Odor data on the MSDS),		
	b. Sight (Appearance data on the MSDS),		
	c. Sound (High pressure leaks), and		
_	d. Taste		
<i>5</i> .	How to lessen or prevent exposure to these hazards through usage of control equipment, work practices, and personal protective equipment.		
6	Steps the Company has taken to lessen or prevent exposure to these substances.		
7.	Emergency procedures to follow in the event of a release of a hazardous substance.		
8.	How to read and understand MSDSs and labels to obtain appropriate information.		
	EMPLOYEE DATE: SIGNATURE:		
I CER	TIFY THE ABOVE NAMED EMPLOYEE WAS TRAINED AS STATED.		
TRAINE	CR SIGNATURE: DATE:		

#### **EXHIBIT 2**

**BLUE** 

# THE HAZARDOUS MATERIALS INFORMATION SYSTEM (HMIS LABELING)

What t	o lool	k for:
--------	--------	--------

Chemical materials may be stenciled on tanks, vats, drums, rail cars, etc.

The HMIS marking system may be used on many items and alerts you as to container contents and possible hazards associated with the material.

The HMIS system utilizes a rectangular shaped label with the following four (4) colors for hazard identification.

Health Hazard

YELLOW ~~~~	
Additionally, the HMIS syster hazards as follows:	m incorporates a numerical system for identification of the degree of
0	Minimal hazard (this does not mean no hazard) Slight hazard Moderate hazard Serious hazard Severe hazard
White (MSDS Number)	
Blue (Health hazard)	<del></del>
Red (Fire Hazard)	HAZARD RATINGS
Yellow (Reactivity Hazard)	<del></del>
Personal Protective	

#### **EXHIBIT 3**

# CONTRACTOR / SUBCONTRACTOR NOTIFICATION OF HAZARDOUS SUBSTANCES

Both federal and state regulations require you, as a contractor or subcontractor, to be notified of areas within this site which contain hazardous chemicals or materials as defined within the Hazard Communication Standard. Additionally, your employees must have access to any material safety data sheet relative to their existing and/or potential exposures.

Your employees will be working in the following area(s) which contain hazardous chemicals or

materials (as defined by governmental definition	).
1.	
2.	
3.	
4.	
5.	
6.	
Project Manager or Site Safety Officer.	aterial safety data sheets are maintained by the
By way of your signature, you attest that Site M hazardous materials at the site and where the app	Management has informed you of the presence of propriate MSDS file is maintained.
C. A. C. A. B.	
Contractor Signature & Date	Project Management Signature & Date

#### APPENDIX D

#### MATERIAL SAFETY DATA SHEETS



#### **Genium Publishing Corporation**

1145 Catalyn Street Schenectady, NY 12303-1836 USA (518) 377-8854

#### Material Safety Data Sheets Collection:

Sheet No. 468 Fuel Oil No. 1

Issued: 3/82

Revision: A, 11/90

Section 1. Material Identification Fuel Oil No. 1 Description: A kerosine-like mixture of petroleum hydrocarbons; a distillate of controlled sulfur content.

Fuel oil no. 1 is available for home heating use.

Other Designations: Coal oil, heating fuel, kerosene, kerosine, range oil.

Manufacturer: Contact your supplier or distributor. Consult the latest Chemicalweek Buyers' Guide(73) for a suppliers list.

HMIS

2

Sec. 8

NFPA

PPG\*

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Cautions: Fuel cil No. 1 is a skin, eye, and mucous membrane irritant and central nervous system (CNS) depressant. Ingestion may lead to aspiration pneumonitis. It is flammable when exposed to heat or flame.

Section 2. Ingredients and Occupational Exposure Limits

Fuel oil No. 1, ca 100%

1989 OSHA PEL None established

1990-91 ACGIH TLV

None established

1988 NIOSH REL None established

1985-86 Toxicity Data\*

Rat, oral, LD<sub>so</sub>: 9 g/kg; produces gastrointestinal effects

(hypermotility, diar-hea)

\* Monitor NIOSH, RTECS (HZ1800000), for future toxicity data.

Section 3. Physical Data

Boiling Range: 302 to 554 F (150 to 290 °C)

Freezing Point: -40 °F (-40 °C) Vapor Pressure, 100 °F (38 °C): ca 5

Viscosity: 160 centistoke at 99.5 °F (37.5 °C)

Appearance and Odor: Light amber liquid with a mild petroleum odor.

Specific Gravity: 0.8251 at 59 °F (15 °C)

Water Solubility: Insoluble % Volatile by Volume: >99

Section 4. Fire and Explosion Data

Flash Point: 100 to 162 \*F (43 to 72 \*C) | AutoignItion Temperature: 410 \*F (210 \*C) | LEL: 0.7% v/v

UEL: 5% v/v

Extinguishing Media: Use dry chemcial, carbon dioxide, foam, water fog or spray. Do not use a forced water spray directly on burning oil since this scatters the fire. Use a smothering technique to extinguish fire.

Unusual Fire or Explosion Hazards: Caution! Vapors may spread to an ignition or heat source and burn with explosive violence.

Special Fire-fighting Procedures: Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode and full protective clothing. Be aware of runoff from fire control methods. Do not release to sewers or waterways due to health and fire or explosion hazard.

Section 5. Reactivity Data

Stability/Polymerization: Fuel oil no. 1 is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.

Chamical Incompatibilities: Fuel oil no. 1 is incompatible with strong oxidizing agents; heating greatly increases fire hazard.

Conditions to Avoid: Avoid heat and ignition sources.

Hazardous Products of Decomposition: Thermal oxidative decomposition of fuel oil no. 1 can produce carbon dioxide; incomplete combustion can produce carbon monoxide.

Section 6. Health Hazard Data

Carcinogenicity: Although the IARC has not assigned an overall evaluation, it has evaluated occupational exposures in petroleum refining as IARC probable human carcinogens (Group 2A).

Summary of Risks: Fuel oil No. 1 is insufficiently volatile to constitute an acute inhalation hazard. Excessive inhalation of aerosol or mist can cause respiratory tract irritation, headache, dizziness, nausea, stupor, convulsions, or unconsciousness, depending on concentration and exposure time. When removed from exposure area, affected persons usually experience complete recovery. Death may occur by asphyxiation due to Continue on next page

#### Section 6. Health Hazard Data, continued

pulmonary edema and consolidation. Late lung changes are noted in survivors. The characteristic lung lesion is an acute, fulminant, hemorrhagic bronchopneumonia. Other systemic effects include heart (potentially fatal rhythm disturbances), liver, kidney, bone marrow and spieen changes. The mean oral lethal dose is ~4 to 6 oz, with death occurring within 2 to 24 hr. Hemorrhaging and pulmonary edema, progressing to renal involvement and chemical pneumonitis, may result if vomiting occurs after ingestion, and oil is aspirated into the lungs. Death may result from as little as 1/2 oz, while survival is noted up to 12 oz ingested. Ingestion's systemic effect is primarily central nervous system (CNS) depression which may lead to come and respiratory depression. Gastrointestinal (GI) lining irritation may cause burning of mouth, esophagus, and stomach, as well as vomiting, intestinal cramping, and blood-tinged diarrhea. Fuel oil No. 1 is irritating to skin and mucous membranes. Percutaneous absorption may be significant. Prolonged contact may cause significant skin damage (epidermal necrolysis, or scalded skin appearance). Kidney damage appears to occur at higher frequency after prolonged skin exposure. Eye contact with liquid or vapor may cause irritation. Medical Conditions Aggravated by Long-Term Exposure: None reported.

Target Organs: Central nervous system, skin, and mucous membranes.

Target Organs: Central nervous system, skin, and mucous membranes.

Primary Entry Routes: Inhalation, ingestion.

Acute Effects: Systemic effects from ingestion include GI irritation, vomiting, diarrhea, and, in severe cases, CNS depression, progressing to coma and death. Inhalation of aerosol or mists may result in increased respiration, tachycardia (excessively rapid heart beat), and cyanosis (dark purplish coloration of skin and mucous membranes caused by deficient blood oxygenation). Chronic Effects: Repeated skin contact causes dermatitis.

FIRST AID

Eyes: Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.

Skin: Quickly remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. If large areas of the body are exposed or if irritation persists, get medical help immediately. Wash affected area with soap and water.

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, do not induce vomiting due to aspiration hazard. Contact a physician immediately.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Gastric lavage is contraindicated due to aspiration hazard. Preferred antidotes are charcoal and milk. In cases of severe aspiration pneumonitis, consider monitoring arterial blood gases to ensure adequate ventilation. Observe the patient for 6 hr. If vital signs become abnormal or symptoms develop, obtain a chest x-ray.

#### Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, evacuate area for large spills, remove all heat and ignition sources, and provide maximum explosion-proof ventilation. Cleanup personnel should protect against vapor inhalation and liquid contact. Clean up spills promptly to reduce fire or vapor hazards. Use a noncombustible absorbent material to pick up small spills or residues. For large spills, dike far ahead to contain. Pick up liquid for reclamation or disposal. Do not release to sewers or waterways due to health and fire and/or explosion hazard. Follow applicable OSHA regulations (29 CFR 1910.120).

Disposal: Coníact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

**EPA Designations** 

Listed as a RCRA Hazardous Waste (40 CFR 261.21): Ignitable waste CERCLA Hazardous Substance (40 CFR 302.4): Not listed SARA Extremely Hazardous Substance (40 CFR 355): Not listed

SARA Toxic Chemical (40 CFR 372.65): Not listed

**OSHA** Designations

Air Contaminant (29 CFR 1910.1000, Subpart Z): Not listed

#### Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Respirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use a NIOSH-approved respirator with mist filter and organic vapor cartridge. For emergency or nonroutine operations (cleaning spills, other: Wear impervious gloves, boots, aprons, and gauntlets to prevent skin contact. Nitrile or polyvinyl alcohol gloves are recommended. Ventilation: Provide general and local explosion-proof ventilation systems to maintain airborne concentrations that promote worker safety and productivity. Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source. (103) Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities. Contaminated Equipment: Never wear contact lenses in the work area; soft lenses may absorb, and all lenses concentrate, irritants. Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

#### Section 9. Special Precautions and Comments

Storage Requirements: Use and storage conditions should be suitable for an OSHA Class Il combustible liquid. Store in closed containers in a well-ventilated area away from heat and ignition sources and strong oxidizing agents. Protect containers from physical damage. To prevent static sparks, electrically ground and bond all containers and equipment used in sparks, electrically ground and bond all containers and equipment used in sparks, electrically ground and bond all containers and equipment used in sparks. and explosion-proof electrical equipment. No smoking in areas of storage or use.

Engineering Controls: Avoid prolonged skin contact and vapor or mist inhalation. Use only in a well-ventilated area and with personal protective gear. Institute a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Practice good personal hygiene and housekeeping procedures. Do not wear oil contaminated clothing. Do not put oily rags in pockets. When working with this material, wear gloves or use barrier cream.

Transportation Data (49 CFR 172.101) DOT Shipping Name: Fuel oil

DOT Hazard Class: Combustible liquid

ID No.: NA1993 DOT Label: None

**DOT Packaging Exceptions: 173.118a DOT Packaging Requirements: None** 

MSDS Collection References: 1, 6, 7, 12, 73, 84, 103, 126, 131, 132, 133, 136, 143

Prepared by: MJ Allison, BS; Industrial Hygiene Review: DJ Wilson, CIH; Medical Review: W Silverman, MD; Edited by: JR Stuart, MS

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#### **Genium Publishing Corporation**

1145 Catalyn Street Schenectady, NY 12303-1836 USA (518) 377-8854

#### Material Safety Data Sheets Collection:

Sheet No. 467 Automotive Gasoline, Lead-free

Issued: 10/81

Revision: A. 9/91

#### Section 1. Material Identification

Automotive Gasoline, Lead-free, Description: A mixture of volatile hydrocarbons composed mainly of branched-chain paraffins, cycloparaffins, olefins, naphthenes, and aromatics. In general, gasoline is produced from petroleum, shale oil, Athabasca tar sands and coal. Motor gasolines are made chiefly by cracking processes, which convert heavier petroleum fractions into more volatile fractions by thermal or catalytic decomposition. Widely used as fuel in internal combustion engines of the spark-ignited, reciprocating type. Automotive gasoline has an octane number of approximately 90. A high content of aromatic hydrocarbons and a consequent high toxicity are also associated with a high octane rating. Some gasolines sold in the US contain a minor proportion of tetraethyllead, which is added in concentrations not exceeding 3 ml per gallon to prevent engine "knock." However, methyl-tert-butyl ether (MTBE) has almost completely replaced tetraethyllead.

Other Designations: CAS No. 8006-61-9, benzin, gasoline, gasolene, motor spirits, natural gasoline, petrol. Manufacturer: Contact your supplier or distributor. Consult latest Chemical Week Buyers' Guide<sup>(73)</sup> for a suppliers list.

35
R 1 NFPA
I 2
S 2\*
K 4
\* Skin
absorption

HMIS
H 2
F 3
R 1
PPG†

† Sec. 8

Cautions: Inhalation of automotive gasoline vapors can cause intense burning in throat and lungs, central nervous system (CNS) depression, and possible fatal pulmonary edema. Gasoline is a dangerous fire and explosion hazard when exposed to heat and flames.

#### Section 2. Ingredients and Occupational Exposure Limits

Automotive gasoline, lead-free\*

1990 OSHA PELs

3-hr TWA: 300 ppm. 900 mg/m³ 15-min STEL: 500 ppm, 1500 mg/m³ 1990-91 ACGIH TLVs

TWA: 300 ppm, 890 mg/m<sup>3</sup> STEL: 500 ppm, 1480 mg/m<sup>3</sup>

1990 NIOSH REL None established 1985-86 Toxicity Data\*

Man, inhalation, TC<sub>1</sub>: 900 ppm/1 hr; toxic effects include sense organs and special senses (conjunctiva irritation), behavioral (hallucinations, distorted perceptions), lungs, thorax, or respiration (cough)

Human, eye: 140 ppm/8 hr; toxic effects include mild irritation Rat, inhalation, LC<sub>ee</sub>: 300 g/m<sup>3</sup>/5 min

A typical modern gasoline composition is 80% paraffins, 14% aromatics, and 6% olefins. The mean benzene content is approximately 1%. Other additives include sulfur, phosphorus, and MTBE.

\* See NTOSH, RTECS (LX3300000), for additional toxicity data.

Section 3. Physical Data

Boiling Point: Initially, 102 °F (39 °C); after 10% distilled, 140 °F (60 °C); after 50% distilled, 230 °F (110 °C); after 90% distilled, 338 °F (170 °C); final boiling point, 399 °F (204 °C)

Vapor Density (air = 1): 3.0 to 4.0

Density/Specific Gravity: 0.72 to 0.76 at 60 °F (15.6 °C)

Water Solubility: Insoluble

Appearance and Odor: A clear (gasoline may be colored with dye), mobile liquid with a characteristic odor recognizable at about 10 ppm in air.

#### Section 4. Fire and Explosion Data

Flash Point: -45 °F (-43 °C)

Autoignition Temperature: 536 to 853 °F (280 to 456 °C) | LEL: 1.3% v/v

UEL: 6.0% v/v

Extinguishing Media: Use dry chemical, carbon dioxide, or alcohol foam as extinguishing media. Use of water may be ineffective to extinguish fire, but use water spray to knock down vapors and to cool fire-exposed drums and tanks to prevent pressure rupture. Do not use a solid stream of water since it may spread the fuel.

Unusual Fire or Explosion Hazards: Automobile gasoline is an OSHA Class IB flammable liquid and a dangerous fire and explosion hazard when exposed to heat and flames. Vapors can flow to an ignition source and flash back. Automobile gasoline can also react violently with exidizing agents.

Special Fire-fighting Procedures: Isolate hazard area and deny entry. Since fire may produce toxic furnes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode, and full protective clothing. When the fire is extinguished, use nonsparking tools for cleanup. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

#### Section 5. Reactivity Data

Stability/Polymerization: Automotive gasoline is stable at room temperature in closed containers under normal storage and handling conditions.

hemical Incompatibilities: Automotive gasoline can react with oxidizing materials such as peroxides, nitric acid, and perchlorates. "Conditions to Avoid: Avoid heat and ignition sources.

Hazardous Products of Decomposition: Thermal oxidative decomposition of automotive gasoline can produce oxides of carbon and partially oxidized hydrocarbons.

#### Section 6. Health Hazard Data

Carcinogenicity: In 1990 reports, the IARC list gasoline as a possible human carcinogen (Group 2B). Although the IARC has assigned an overall cvaluation to gasoline, it has not assigned an overall evaluation to specific substances within this group (inadequate human evidence).

Summary of Risks: Gasoline vapors are considered moderately poisonous. Vapor inhalation can cause central nervous system (CNS) depression and mucous membrane and respiratory tract irritation. Brief inhalations of high concentrations can cause a fatal pulmonary edema. Reported responses to gasoline vapor concentrations are: 160 to 270 ppm causes eye and throat irritation in several hours; 500 to 900 ppm causes eye, nose, and throat irritation, and dizziness in 1 hr; and 2000 ppm produces mild anesthesia in 30 min. Higher concentrations are intoxicating in 4 to 10 minutes. If large areas of skin are exposed to pasoline toxic amounts may be absorbed. Repeated or prolonged skin exposure causes dermaticis minutes. If large areas of skin are exposed to gasoline, toxic amounts may be absorbed. Repeated or prolonged skin exposure causes demantitis. Certain individuals may develop hypersensitivity. Ingestion can cause CNS depression. Pulmonary aspiration after ingestion can cause severe pneumonitis. In adults, ingestion of 20 to 50 g gasoline may produce severe symptoms of poisoning.

Medical Conditions Aggravated by Long-Term Exposure: None reported.

Target Organs: Skin, eye, respiratory and central nervous systems.

Primary Entry Routes: Inhalation, ingestion, skin contact.

Acute Effects: Acute inhalation produces intense nose, throat, and lung irritation; headaches; blurred vision; conjunctivitis; flushing of the face; mental confusion; staggering gait; slurred speech; and unconsciousness, sometimes with convulsions. Ingestion causes inebriation (drunkenness), vomiting, dizziness, fever, drowsiness, confusion, and cyanosis (a blue to dark purplish coloration of skin and mucous membrane caused by lack of oxygen). Aspiration causes choking, cough, shortness of breath, increased rate of respiration, excessively rapid heartbeat, fever, bronchitis, and pneumonitis. Other symptoms following acute exposure include acute hemorrhage of the pancreas, fatty degeneration of the liver and kidneys, and passive congestion of spleen.

Chronic Effects: Chronic inhalation results in appetite loss, nausea, weight loss, insomnia, and unusual sensitivity (hyperesthesia) of the distal extremities followed by motor weakness, muscular degeneration, and diminished tendon reflexes and coordination. Repeated skin exposure can

cause blistering, drying, and lesions.

FIRST AID

Eyes: Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.

Skin: Quickly remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. For reddened or blistered skin, consult a physician. Wash affected area with soap and water.

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, do not induce vomiting due to aspiration hazard. Give conscious victim a mixture of 2 tablespoons of activated charcoal mixed in 8 oz of water to drink. Consult a physician immediately. After first aid, get appropriate in-plant, paramedic, or community medical support.

#### Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, evacuate all unnecessary personnel, remove heat and ignition sources, and provide maximum explosion-proof ventilation. Cleanup personnel should protect against vapor inhalation and liquid contact. Use nonsparking tools. Take up small spills with sand or other noncombustible adsorbent. Dike storage areas to control leaks and spills. Follow applicable OSHA regulations (29 CFR 1910.120). Aquatic Toxicity: Bluegill, freshwater, LC<sub>50</sub>, 8 ppm/96 hr. Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations
RCRA Hazardous Waste (40 CFR 261.21): Characteristic of ignitability

CERCLA Hazardous Substance (40 CFR 302.4): Not listed SARA Extremely Hazardous Substance (40 CFR 355): Not listed SARA Toxic Chemical (40 CFR 372.65): Not listed

**OSHA Designations** 

Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

#### Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Since

contact lens use in industry is controversial, establish your own policy.

Respirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. There are no specific NIOSH recommendations. However, for vapor concentrations not immediately. ately dangerous to life or health, use chemical cartridge respirator equipped with organic vapor cartridge(s), or a supplied air respirator. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Other: Wear impervious gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Materials such as neoprene or polyvinyl alcohol provide excellent/good resistance for protective clothing. Note: Resistance of specific materials can vary from product to

product.

Ventilation: Provide general and local explosion-proof exhaust ventilation systems to maintain airborne concentrations below the OSHA PELs

Ventilation: Provide general and local explosion-proof exhaust ventilation systems to maintain airborne concentrations below the OSHA PELs (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source. (103) Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities. Contaminated Equipment: Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

#### Section 9. Special Precautions and Comments

Storage Requirements: Store in closed containers in a cool, dry, well-ventilated area away from heat and ignition sources and strong oxidizing agents. Protect containers from physical damage. Avoid direct sunlight. Storage must meet requirements of OSHA Class IB liquid. Outside or detached storage preferred.

Engineering Controls: Avoid vapor inhalation and skin or eye contact. Consider a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Indoor use of this material requires explosion-proof exhaust ventilation to remove vapors. Only use gasoline as a fuel source due to its volatility and flammable/explosive nature. Practice good personal hygiene and housekeeping procedures. Wear clean work clothing daily.

Transportation Data (49 CFR 172.101, .102)

DOT Shipping Name: Gasoline (including casing-head and natural)

DOT Hazard Class: Flammable liquid

ID No.: UN1203

DOT Label: Flammable liquid DOT Packaging Exceptions: 173.118 DOT Packaging Requirements: 173.119

IMO Shipping Name: Gasoline IMO Hazard Class: 3.1 ID No.: UN1203 IMO Label: Flammable liquid IMDG Packaging Group: II

MSDS Collection References: 26, 73, 89, 100, 101, 103, 124, 126, 127, 132, 133, 136, 138, 140, 143, 146, 153, 159 Prepared by: M Allison, BS; Industrial Hygiene Review: DJ Wilson, CIH; Medical Review: W Silverman, MD; Edited by: JR Stuart, MS



#### Genium Publishing Corporation

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#### Material Safety Data Sheets Collection:

Sheet No. 469 Fuel Oil No. 2

Issued: 10/81

Revision: A, 11/90

#### Section 1. Material Identification

R 1

I uel Cil No. 2 Description: A mixture of petroleum hydrocarbons; a distillate of low sulfur content. Fuel oil no. 2 resembles kerosine. Used as a general-purpose domestic or commercial fuel in atomizing-type burners; as a fuel for trucks, 2 snips and other automotive engines; as mosquito control (coating on breeding waters); and for drilling muds. (ther Designations: CAS No. 68476-30-2, diesel oil.

Manufacturer: Confact your supplier or distributor. Consult the latest Chemicalweek Buyers' Guide<sup>(73)</sup> for a suppliers list.

**NFPA** 

Cautions: Fuel oil No. 2 is a skin irritant and central nervous system depressant with high mist concentrations. It is an environmental hazard and a dangerous fire hazard when exposed to heat, flame, or oxidizers.

PPG\* \* S∞. 8

#### Section 2. Ingredients and Occupational Exposure Limits

Fuel oil No. 2\*

1989 OSHA PEL

1990-91 ACGIH TLV

1988 NIOSH REL

1985-86 Toxicity Data†

None established

None established

None established

Rat, oral, L.D.: 9 g/kg; produces gastrointestinal effects (hypermotility, diarrhea)

\* A complex mixture (<35%) of paraffinic, olefinic, naphthenic, and aromatic hydrocarbons; sulfur content (<0.5%); and benzene (<100 ppm). [A low benzene level reduces carcinogenic rise. Fuel oils can be exempted under the benzene standard (29 CFR 1910.1028)]. † Monitor NIOSH, RTECS (HZ1800000), for future toxicity data.

#### Section 3. Physical Data

Rolling Point Range: 363 to 634 °F (184 to 334 °C) cosity: 268 centistake at 100 °F (37.8 °C)

Water Solubility: Insoluble Pour Point:\* <21 °F (-6 °C)

# ecific Gravity: 0.8654 at 59 °F (15 °C)

Appearance and Odor: Brown, slightly viscous liquid.

\*Pour point is the lowest temperature at which a liquid flows from an inverted test container.

#### Section 4. Fire and Explosion Data

Flash Point: 100 'F (38 'C) min.

Autoignition Temperature: 494 °F (257 °C) LEL: 0.6% v/v

UEL: 7.5% v/v

E) tinguishing Media: Use dry chemical, carbon dioxide, foam, water fog or spray. Do not use a forced water spray directly on burning oil since this scatters the fire. Use a smothering technique to extinguish fire.

Unusual Fire or Explosion Hazards: Vapors may travel to an ignition source and flash back. This fuel oil's volatility is similar to gasoline's. Special Fire-fighting Procedures: Isolate hazard area and deny entry. Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode and full protective clothing. If feasible, remove containers from fire. Be aware of runoff from fire control methods. Do not release to sewers or waterways due to health and fire or explosion ha ard.

#### Section 5. Reactivity Data

Stability/Polymerization: Fuel oil no. 2 is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.

Chemical Incompatibilities: Incompatible with strong oxidizing agents; heating greatly increases fire hazard.

Conditions to Avoid: Avoid heat and ignition sources.

Hazardous Products of Decomposition: Thermal oxidative decomposition of fuel oil no. 2 yields various hydrocarbon and hydrocarbon derivatives and partial exidation products including carbon dioxide, carbon monoxide, and sulfur dioxide.

#### Section 6. Health Hazard Data

Carcinogenicity: Although it has not assigned an overall evaluation to fuel oil No. 2, the IARC has evaluated distillate (light) fuel oils as not classifiable as human carcinogen (Group 3; animal evidence limited).

Summary of Risks: Excessive inhalation of aersol or mist can cause respiratory tract irritation, headache, dizziness, nausea, stupor, convulsions, or unconsciousness, depending on concentration and time of exposure. Since intestinal absorption of longer chain hydrocarbons is lower than absorption from lighter fuels, a lesser degree of systemic effects and more diarrhea may result. When removed from exposed area, affected persons usually experience complete recovery. Hemorrhaging and pulmonary edema, progressing to renal involvement and chemical pneumonitis, may result if oil is aspirated into the lungs. These results are more likely when vomiting after ingestion rather than upon ingestion, as is often the case with lower viscosity fuels. A comparative ratio of oral-to-expirated lethal doses may be 1 pt vs. 5 ml. Prolonged or repeated skin contact may cause irritation of the hour follicles and may block the selections are producing a rash of agree nimples and spots, usually on arms and legs. Cause irritation of the hair follicles and may block the sebaceous glands, producing a rash of acne pimples and spots, usually on arms and legs.

Medical Conditions Aggravated by Long-Term Exposure: None reported.

Target Organs: Central nervous system (CNS), skin, and mucous membranes.

Primary Entry Routes: Inhalation, ingestion.

Acute Effects: Systemic effects from ingestion include gastrointestinal (GI) irritation, vomiting, diarrhea, and, in severe cases, CNS depression, progressing to come and death. Inhalation of aerosol or mists may result in increased rate of respiration, tachycardia (excessively rapid heart beal), and cyanosis (dark purplish coloration of the skin and mucous membranes caused by deficient blood oxygenation). Chronic Effects: Repeated contact with the skin causes dermatitis.

FIRST AID

Eyes: Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.

Skin: Quickly remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. If large areas of the body are exposed or if irritation persists, get medical help immediately. Wash affected area with soap and water.

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, do not induce vomiting due to aspiration hazard. Contact a physician immediately.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Gastric lavage is contraindicated due to aspiration hazard. Preferred antidotes are charcoal and milk. In cases of severe aspiration pneumonitis, consider monitoring arterial blood gases to ensure adequate ventilation. Observe the patient for 6 hr. If vital signs become abnormal or symptoms develop, obtain a chest x-ray.

#### Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, evacuate area for large spills, remove all heat and ignition sources, and provide maximum explosion-proof ventilation. Cleanup personnel should protect against vapor inhalation and liquid contact. Clean up spills promptly to reduce fire or vapor hazards. Use noncombustible absorbent material to pick up small spills or residues. For large spills, dike far ahead to contain. Pick up liquid for reclamation or disposal. Do not release to sewers or waterways due to health and fire and/or explosion hazard. Follow applicable OSHA regulations (29 CFR 1910.120). Fuel oil no. 2 is an environmental hazard. Report large spills.

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations

Listed as a RCRA Hazardous Waste (40 CFR 261.21): Ignitable waste CERCLA Hazardous Substance (40 CFR 302.4): Not listed

SARA Extremely Hazardous Substance (40 CFR 355): Not listed

SARA Toxic Chemical (40 CFR 372.65): Not listed

**OSHA Designations** 

Air Contaminant (29 CFR 1910.1000, Subpart Z): Not listed

#### Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Respirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use a NIOSH-approved respirator with mist filter and organic vapor cartridge. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Other: Wear impervious gloves, boots, aprons, and gauntlets to prevent skin contact.

Ventilation: Provide general and local explosion-proof ventilation systems to maintain airborne concentrations that promote worker safety and productivity. Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source. (103) Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities. Contaminated Equipment: Never wear contact lenses in the work area: soft lenses may absorb, and all lenses concentrate, irritants. Remove this

naterial from your shoes and equipment. Launder contaminated clothing before wearing.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, moking, using the toilet, or applying cosmetics.

#### Section 9. Special Precautions and Comments

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storage Requirements: Use and storage conditions should be suitable for an OSHA Class II combustible liquid. Store in closed containers in a vell-ventilated area away from heat and ignition sources and strong oxidizing agents. Protect containers from physical damage. To prevent static parks, electrically ground and bond all containers and equipment used in shipping, receiving, or transferring operations. Use nonsparking tools nd explosion-proof electrical equipment. No smoking in areas of storage or use.

Ingineering Controls: Avoid prolonged skin contact and vapor or mist inhalation. Use only in a well-ventilated area with personal protective

car. Institute a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Practice good personal ygiene and housekeeping procedures. Do not wear oil contaminated clothing. Do not put oily rags in pockets. When working with this material, /ear gloves or use barrier cream.

Transportation Data (49 CFR 172.101)

OT Shipping Name: Fuel oil

OT Hazard Class: Combustible liquid

D No.: NA1993 OT Label: None

OT Packaging Exceptions: 173.118a OT Packaging Requirements: None

ISDS Collection References: 1, 6, 7, 12, 73, 84, 103, 126, 127, 132, 133, 136, 143 repared by: MJ Allison, BS; Industrial Hygiene Review: DJ Wilson, CIH; Medical Review: W Silverman, MD; Edited by: JR Stuart, MS



#### **Genium Publishing Corporation**

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#### Material Safety Data Sheets Collection:

Sheet No. 470 Diesel Fuel Oil No. 2-D

Issued: 10/81

Revision: A, 11/90

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PPG\*

#### Section 1. Material Identification

Diesel Fuel Oil No. 2-D Description: Diesel fuel is obtained from the middle distillate in petroleum separation; a distillate oil of low sulfur content. It is composed chiefly of unbranched paraffins. Diesel fuel is available in various grades, one of which is synonymous with fuel oil No. 2-D. This diesel fuel oil requires a minimum Cetane No. (efficiency rating for diesel fuel comparable to octane number ratings for gasoline) of 40 (ASTM D613). Used as a fuel for trucks, ships, and other automotive engines; as mosquito control (coating on breeding waters); and for drilling muds.

Other Designations: CAS No. 68334-30-5, diesel fuel.

Manufacturer: Contact your supplier or distributor. Consult the latest Chemicalweek Buyers' Guide(73) for a suppliers list.

Cautions: Diesel fuel oil No. 2-D is a skin irritant and central nervous depressant with high mist concentrations. It is an environmental hazard and moderate fire risk.

Section 2. Ingredients and Occupational Exposure Limits

Diesel fuel oil No. 2-D\*

1989 OSHA PEL

1990-91 ACGIH TLV

1988 NIOSH REL

1985-86 Toxicity Data‡

None established Mineral Oil Mist

TWA: 5 mg/m<sup>3</sup>† STEL: 10 mg/m<sup>3</sup> None established

Rat, oral, LD<sub>so</sub>: 9 g/kg produces gastrointestinal (hypermotility, diarrhea)

effects

\* Diesel fuel No. 2-D tends to be low in aromatics and high in paraffinics. This fuel oil is complex mixture of: 1) >95% paraffinic, olefinic, naphthenic, and aromatic hydroxarbons, 2) sulfur (<0.5%), and 3) benzene (<100 ppm). [A low benzene level reduces carcinogenic risk. Fuel oils can be exempted under the benzene standard (29 CFR 1910.1028)]. Although low in the fuel itself, benzene concentrations are likely to be much higher in processing areas.

† As sampled by nonvapor-collecting method.

# Monitor NIOSH, RYECS (HZ1800000), for future toxicity data.

Section 3. Physical Data

Boiling Point Range: 340 to 675 °F (171 to 358 °C)

Viscosity: 1.9 to 4.1 centistoke at 104 °F (40 °C)

Specific Gravity: <0.86

Water Solubility: Insoluble

Appearance and Odor: Brown, slightly viscous liquid.

#### Section 4. Fire and Explosion Data

Flash Point: 125 'F (52 'C) min. Autoignition Temperature: >500 'F (932 'C) LEL: 0.6% v/v

UEL: 7.5% v/v

Extinguishing Media: Use dry chemical, carbon dioxide, or foam to fight fire. Use a water spray to cool fire exposed containers. Do not use a forced water spray directly on burning oil since this will scatter the fire. Use a smothering technique for extinguishing fire.

Unusual Fire or Explosion Hazards: Diesel fuel oil No. 2-D is a OSHA Class II combustible liquid. Its volatility is similar to that of gas oil. Vapors may travel to a source of ignition and flash back.

Special Fire-fighting Procedures: Isolate hazard area and deny entry. Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode and full protective clothing. If feasible, remove containers from fire. Be aware of runoff from fire control methods. Do not release to sewers or waterways due to pollution and fire or explosion hazard.

#### Section 5. Reactivity Data

Stability/Polymerization: Diesel fuel oil No. 2-D is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.

Chemical Incompatibilities: It is incompatible with strong oxidizing agents; heating greatly increases the fire hazard.

Conditions to Avoid: Avoid heat and ignition sources.

Hazardous Products of Decomposition: Thermal oxidative decomposition of diesel fuel oil No. 2-D can produce various hydrocarbons and nydrocarbon derivatives, and other partial oxidation products such as carbon dioxide, carbon monoxide, and sulfur dioxide.

#### Section 6. Health Hazard Data

Carcinogenicity: Although the IARC has not assigned an overall evaluation to diesel fuels as a group, it has evaluated occupational exposures in petroleum refining as an IARC probable human carcinogen (Group 2A). It has evaluated distillate (light) diesel oils as not classifiable as human

carcinogens (Group 3)

Summary of Risks: Although diesel fuel's toxicologic effects should resemble kerosine's, they are somewhat more pronounced due to additives such as sulfurized esters. Excessive inhalation of aerosol or mist can cause respiratory tract irritation, headache, dizziness, nausea, vomiting, and loss of coordination, depending on concentration and exposure time. When removed from exposure area, affected persons usually recover completely. If vomiting occurs after ingestion and if oil is aspirated into the lungs, hemorrhaging and pulmonary edema, progressing to renal involvement and chemical pneumonitis, may result. A comparative ratio of oral to aspirated lethal doses may be 1 pt vs. 5 ml. Aspiration may also result in transient CNS depression or excitement. Secondary effects may include hypoxia (insufficient oxygen in body cells), infection, pneumato-cele formation, and chronic lung dysfunction. Inhalation may result in euphoria, cardiac dysrhythmias, respiratory arrest, and CNS toxicity.

Prolonged or repeated skin contact may irritate hair follicies and block sebaceous glands, producing a rash of acne pimples and spots, usually on

Medical Conditions Aggravated by Long-Term Exposure: None reported. Target Organs: Central nervous system, skin, and mucous membranes.

Primary Entry Routes: Inhalation, ingestion.

Acute Effects: Systemic effects from ingestion include gastrointestinal irritation, vomiting, diarrhea, and in severe cases central nervous system depression, progressing to come or death. Inhalation of aerosols or mists may result in increased rate of respiration, tachycardia (excessively rapid neart beat), and cyanosis (dark purplish discoloration of the skin and mucous membranes caused by deficient blood oxygenation). Thronic Effects: Repeated contact with the skin causes dermatitis.

**IRST AID** 

lyes: Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical

acility. Consult a physician immediately.

kin: Quickly remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. If large areas of the body have been xposed or if irritation persists, get medical help immediately. Wash affected area with soap and water.

nhalation: Remove exposed person to fresh air and support breathing as needed.

ngestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, do not induce vomiting due to aspiration hazard.

ontact a physician immediately. Position to avoid aspiration.

fter first aid, get appropriate in-plant, paramedic, or community medical support.

ote to Physicians: Gastric lavage is contraindicated due to aspiration hazard. Preferred antidotes are charcoal and milk. In cases of severe spiration pneumonitis, consider monitoring arterial blood gases to ensure adequate ventilation. Observe the patient for 6 hr. If vital signs become enormal or symptoms develop, obtain a chest x-ray.

#### ection 7. Spill, Leak, and Disposal Procedures

pill/Leak: Notify safety personnel, evacuate area for large spills, remove all heat and ignition sources, and provide maximum explosion-proof intilation. Cleanup personnel should protect against vapor inhalation and liquid contact. Clean up spills promptly to reduce fire or vapor hazards, se a noncombustible absorbent material to pick up small spills or residues. For large spills, dike far ahead to contain. Pick up liquid for reclamaon or disposal. Do not release to sewers or waterways due to health and fire and/or explosion hazard. Follow applicable OSHA regulations (29 FR 1910.120). Diesel fuel oil No. 2-D spills may be environmental hazards. Report large spills. isposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

PA Designations

CRA Hazardous Waste (40 CFR 261.21): Ignitable waste ERCLA Hazardous Substance (40 CFR 302.4): Not listed ARA Extremely Hazardous Substance (40 CFR 355): Not listed ARA Toxic Chemical (40 CFR 372.65): Not listed

SHA Designations
r Contaminant (29 CFR 1910.1000, Subpart Z): Not listed

#### ection 8. Special Protection Data

oggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). spirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necesy, use a NIOSH-approved respirator with a mist filter and organic vapor cartridge. For emergency or nonroutine operations (cleaning spills, ctor vessels, or storage tanks), wear an SCBA. Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. her: Wear impervious gloves, boots, aprons, and gauntlets to prevent skin contact.

ntilation: Provide general and local explosion-proof ventilation systems to maintain airborne concentrations that promote worker safety and ductivity. Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source. (11.3) ety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities. ntaminated Equipment: Never wear contact lenses in the work area: soft lenses may absorb, and all lenses concentrate, irritants. Remove this

terial from your shoes and equipment. Launder contaminated clothing before wearing.

mments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, oking, using the toilet, or applying cosmetics.

#### ction 9. Special Precautions and Comments

rage Requirements: Use and storage conditions should be suitable for a OSHA Class II combustible liquid. Store in closed containers in a I-ventilated area away from heat and ignition sources and strong oxidizing agents. Protect containers from physical damage. To prevent static

ks, electrically ground and bond all containers and equipment used in shipping, receiving, or transferring operations. Use nonsparking tools explosion-proof electrical equipment. No smoking in storage or use areas.

ineering Controls: Avoid vapor or mist inhalation and prolonged skin contact. Wear protective rubber gloves and chemical safety glasses re contact with liquid or high mist concentration may occur. Additional suitable protective clothing may be required depending on working litions. Institute a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Practice good onal hygiene and housekeeping procedures. Do not wear oil contaminated clothing. At least weekly laundering of work clothes is recomded. Do not put oily rags in pockets. When working with this material, wear gloves or use barrier cream.

#### asportation Data (49 CFR 172.101)

[ Shipping Name: Fuel oil

1 Hazard Class: Combustible liquid

io.: NA1993

Label: None

Packaging Exceptions: 173.118a Packaging Requirements: None

S Collection References: 1, 6, 7, 12, 73, 84, 101, 103, 126, 127, 132, 133, 136, 143, 146 rred by: MJ Allison, BS; Industrial Hyglene Review: DJ Wilson, CIH; Medical Review: AC Darlington, MD; Edited by: JR Stuart, MS



#### **Genium Publishing Corporation**

1145 Catalyn Street Schenectady, NY 12303-1836 USA (518) 377-8854

#### Material Safety Data Sheets Collection:

Sheet No. 720 Petroleum (Crude)

Issued: 8/90

Section 1. Material Identification

Petroleum (Crude) Description: A highly complex mixture of paraffinic, cycloparaffinic (naphthenic), and aromatic hydrocarbons with molecular weights ranging from the very lightest to over 6000; also containing small amounts of berzene hydrocarbons, sulfur, and oxygenated compounds. Used as a source of gasoline, petroleum ether, fuel and lubricating oils, liquid and solid petrolatum, butane, isopropyl alcohol, and many other products.

Other Designations: CAS No. 8002-05-9, base oil, coal liquid, coal oil, crude oil, petroleum crude, petroleum oil, rock oil, and seneca oil.

Manufacturer: Contact your supplier or distributor. Consult the latest Chemicalweek Buyers' Guide(73) for a suppliers list.

Cautions: Petroleum (crude) is toxic by ingestion and is irritating by skin contact. It is a dangerous fire hazard when exposed to heat, flame, or powerful oxidizers. Its fumes are flammable, asphyxiating, and potentially toxic.

Section 2. Ingredients and Occupational Exposure Limits

Petroleum (crude), ca 100%

1989 OSHA PEL 1989-90 ACGIH TLV

1988 NIOSH REL

1985-86 Toxicity Data\*

None established

None established

None established

Mouse, skin, TD<sub>Le</sub>: 3744 mg/kg administered intermittently over a 2-yr period in a number of separate, discrete doses produces tumorigenic effects; skin and appendages (tumors)

Comment: Crude petroleum is a complex mixture of volatile hydrocarbons and gases. So-called "sour crude" contains toxic and dangerous hydrogen sulfide gas (MSDS Collection, No. 52).

\* See NIOSH, RTECS (SE7175000), for additional mutative and tumorigenic data.

Section 3. Physical Data

Melting Point: -51 °F (-46 °C)
Density: 0.780 to 0.970
Water Solubility: Insoluble

Appearance and Odor: A viscous, dark yellow to brown or greenish-black, oily liquid with an unpleasant odor. Petroleum's (crude light's) upper and lower odor thresholds are 0.5 and 0.1 ppm, respectively.

#### Section 4. Fire and Explosion Data

Flash Point: 20 to 90 °F (-6.7 to 32.2 °C) Autoignition Temperature: None reported

LEL: None reported

UEL: None reported

32

NFPA

**HMIS** 

PPG\*

H 1 F 3 R 0

2

S

Extinguishing Media: To fight fire, use dry chemical, foam, or carbon dioxide.

Unusual Fire or Explosion Hazards: Liquid petroleum contains and gives off considerable amounts of dissolved, possibly explosive gases that are a dangerous fire hazard when exposed to heat, flame, or powerful oxidizers.

Special Fire-fighting Procedures: Isolate hazard entry and deny entry. Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode and fully encapsulating suit. If feasible, move containers from fire area. Otherwise, use a water spray to cool fire-exposed containers. Never apply water directly to a petroleum fire. Water fog or mist will act as a blanket to reduce vapors and cut off the air supply. Stay out of low areas. Vapors may travel to an ignition source and flash back. Be aware of runoff from fire control methods. Do not release to sewers or waterways where it could cause a fire/explosion hazard or pollution.

#### Section 5. Reactivity Data

Stability/Polymerization: Petroleum is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.

Chemical Incompatibilities: Petroleum (crude light) may act as a synergist (a substance that induces a greater effect when added to another substance) to pesticides. Incompatible with oxidizing agents.

Conditions to Avoid: Avoid exposure to heat and ignition sources.

Hazardous Products of Decomposition: Thermal oxidative decomposition of petroleum can emit acrid smoke and fumes.

#### ection 6. Health Hazard Data

recinogenicity: The IARC does not classify petroleum (crude) as a human carcinogen (Group 3) since human and animal evidence are adequate.

mmary of Risks: Petroleum is toxic by ingestion and is a skin irritant. Aspiration pneumonitis (pulmonary toxicity due to aspiration into the 1gs) is the most serious toxic effect following ingestion. Cardiovascular and neurologic toxicity are the major concerns following inhalation. edical Conditions Aggravated by Long-Term Exposure: Chronic skin disease.

rget Organs: Skin, eyes, respiratory system, central nervous system.

imary Entry Routes: Inhalation, accidental ingestion, skin contact.

ute Effects: Ingestion causes nausea, vomiting, diarrhea, and abdominal pain. Liver and renal injury may occur following ingestion. Symptoms aspiration include coughing, choking, shortness of breath, increased respiration, and pulmonary edema. Inhalation of petroleum or its dissolved es may result in respiratory arrest, euphoria, cardiac dysrhythmia, and central nervous system toxicity.

ronic Effects: Prolonged and repeated contact with petroleum can cause skin disorders such as dermatitis.

#### RST AID

es: Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical lity. Consult a physician immediately.

n: Quickly remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. For reddened or blistered skin, consult a sician. Wash affected area with soap and water.

salation: Remove exposed person to fresh air and support breathing as needed.

estion: Never give anything by mouth to an unconscious or convulsing person. If ingested, do not induce vomiting since this increases the ration risk. Keep victim's head between knees. Consult a physician immediately.

er first aid, get appropriate in-plant, paramedic, or community medical support.

sician's Note: Unless a large amount of petroleum is ingested, gastric emptying is not suggested. Consider administering activated charcoal, administer it with caution because it may also cause vomiting and increase the risk of aspiration.

#### ction 7. Spill, Leak, and Disposal Procedures

[/Leak: Notify safety personnel, evacuate all unnecessary personnel, remove all heat and ignition sources, and provide maximum explosionof ventilation. For small spills, take up with sand or other noncombustible absorbent material and place into appropriate containers for disposal, large spills, dike far ahead of spill. Follow applicable OSHA regulations (29 CFR 1910.120).

posal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

#### \ Designations

A Hazardous Waste (40 CFR 261.33): Not listed

:CLA Hazardous Substance (40 CFR 302.4): Not listed

A Extremely Hazardous Substance (40 CFR 355): Not listed

(A Toxic Chemical (40 CFR 372.65)

**IA** Designations

Contaminant (29 CFR 1910.1000, Subpart Z): Not listed

#### tion 8. Special Protection Data

gles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).

irator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if neceswear a NIOSH-approved respirator. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an

A. Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

r: Wear impervious gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact.

ilation: Provide general and local explosion-proof ventilation systems to maintain airborne concentrations that promote worker safety and activity. Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source. (103) by Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.

aminated Equipment: Never wear contact lenses in the work area: soft lenses may absorb, and all lenses concentrate, irritants. Remove this rial from your shoes and equipment. Launder contaminated clothing before wearing.

ments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, ing, using the toilet, or applying cosmetics.

#### ion 9. Special Precautions and Comments

ge Requirements: Store in tightly closed drums or tanks in a cool, dry, well-ventilated area away from heat and ignition sources (naked , sparks, welding equipment). Protect containers from physical damage. To prevent static sparks, electrically ground and bond all containers quipment used in shipping, receiving, or transferring operations in production and storage areas. In addition, conductive tires can further t vehicles.

neering Controls: Use only with adequate ventilation. Workers should be educated about petroleum's hazards and potential dangers.

Ite a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. To prevent dermatitis use approprotective gear and practice good personal hygiene procedures. Monitor storage facilities for gas buildup.

Precautions: Provide annual examinations with emphasis on the skin and respiratory system.

insportation Data (49 CFR 172.102) Shipping Name: Petroleum crude oil

Hazard Class: 3.1, 3.2, 3.3

.: UN1267

Label: Flammable liquid Packaging Group: II

Collection References: 73, 84, 85, 101, 103, 124, 126, 127, 132, 133, 136, 139, 143 ed by: MJ Allison, BS; Industrial Hygiene Review: DJ Wilson, CIH; Medical Review: W Silverman, MD; Edited by: JR Stuart, MS



#### **Genium Publishing Corporation**

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#### Material Safety Data Sheets Collection:

Sheet No. 5 Chromic Acid and Chromates

Issued: 10/77

Revision: C, 7/91

	Section 1. Material Identification	34
	Chromic Acid (CrO <sub>3</sub> ) Description: Produced by roasting chromite ore with alkali or lime, leaching with calcium oxide, R 1	NFPA
ı	crystallizing the chromate or dichromate, and then treating it with an excess of sulfuric acid. Used in ceramic glazes, I 4	$\wedge$
	colored glass, dyes, batteries, explosives, water treatment, wood treatment and preservatives, refractories, copper strip- S 3*	$\langle 0 \rangle$
ı	ping, aluminum anodizing, photomechanical processing, chromium metal plating, purifying oil and acetylene, hardening K 0	$\frac{3}{0}$ $\frac{1}{0}$
	microscopic preparations, and manufacturing chromated copper arsenate; and as a corrosion inhibitor, a catalyst, an Percutane	
	oxidizing agen: in organic chemistry, and an etchant for plastics. (broken ski	in) HMIS
	Other Designations: CAS No. 1333-82-0; chromic acid; chromic acid, solid (DOT); chromium anhydride; chromium (VI) oxide;	11 2
1	chromium trioxide; chromium (6+) trioxide; monochromium trioxide; puratronic chromium trioxide. Chromic acid is the commonly t	ased F 3
1	name, although true chromic acid (CrH,O, CAS No. 7738-94-5) cannot be isolated from solution. Chromic acid and chromates	r u
1	(as CrO <sub>2</sub> , CAS No. 7440-47-3).	K I
1	Manufacturer: Contact your supplier or distributor. Consult latest Chemical Week Buyers' Guide <sup>(13)</sup> for a suppliers list.	PPG† † Sec. 8
ı	Caution: A powerful oxidizer, chromic acid may explode on contact with reducing agents and cause ignition on contact with organic	
	materials. This poison and human carcinogen is corrosive to skin and irritating to mucous membranes. Eye contact may cause perman	ient
1	blindness.	
1	Continued Translation of Occupation of European Date (Continued Continued Co	V 1,000 d + 10,000 1

#### Section 2. Ingredients and Occupational Exposure Limits

Chromic acid, 99% CrO, 1990 OSHA PEL Ceiling: 0.1 mg(CrO<sub>3</sub>)/m<sup>3</sup>

1987 IDLH Level  $30 \text{ mg/m}^3$ 

1990-91 ACGIH TLVs TWA: 0.05 mg(Cr)/m3 Ceiling: 0.1 mg/m<sup>3</sup>

1990 NIOSH REL TWA: 0.025 mg(Cr(VI))/m3 Ceiling: 0.05 mg/m³/15 min (Cr(VI)) 1985-86 Toxicity Data\*

Rat, oral, LD<sub>30</sub>: 80 mg/kg Mouse, oral, LD<sub>30</sub>: 127 mg/kg Human, inhalation, TC<sub>12</sub>: exposed continuously to 110 µg over 3 years. Toxic effects include tumorigenic (carcinogenic by RTECS criteria); sense organs and special senses (olfaction tumors); lungs, thorax, or respiration (tumors).

Dog, subcutaneous, LD<sub>Lo</sub>: 330 mg/kg

" See NIOSH, RTECS (GB6650000), for additional mutative, reproductive, toxicity and tumorigenic data.

#### Section 3. Physical Data\*

Boiling Point: Decomposes at 482 °F (250 °C) to Cr<sub>2</sub>O<sub>3</sub> + O<sub>2</sub> Melting Point: 385 °F (196 °C)

Molecular Weight: 99.98

Specific Gravity: 2.7 Water Solubility: Soluble Heat of Fusion: 37.7 cal/g Appearance and Odor: Dark, purplish-red, prismatic, deliquescent (absorbs all moisture from air) crystals, or a granular powder with no detectable odor.

#### \* These physical data apply only to chromic acid (CAS No. 1333-82-0). Section 4. Fire and Explosion Data

Flash Point: None reported

Autoignition Temperature: None reported

LEL: None reported

**UEL:** None reported

Extinguishing Media: Chromic acid is noncombustible, but accelerates burning of combustibles (wood, paper, oil). For small fires, use only water, not dry chemical, carbon dioxide (CO<sub>2</sub>), or halon.

Unusual Fire or Explosion Hazards: A powerful oxidizer, chromic acid ignites on contact with acetic acid and alcohol. It may react rapidly enough with organic materials to cause ignition. Containers may explode if involved in fire.

Special Fire-fighting Procedures: Isolate hazard area and deny entry. Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Cool fire-exposed containers with flooding amounts of water since the decomposing material may form a hot, viscous foam that can cause containers to rupture and explode. Use caution! For large fires, flood area from a safe distance, and cool containers from the side with a water spray until after fire is well out. If possible without risk, move containers. Stay away from ends of tanks. For massive fire in cargo area, use monitor nozzles or unmanned hose holder. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

#### Section 5. Reactivity Data

Stability/Polymerization: Chromic acid is generally stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.

Chemical Incompatibilities: This material is incompatible with acetic acid, acetic anhydride, acetone, alcohols, alkali metals, ammonia, arsenic, anthracene, benzene, bromine penta fluorine, butyric acid, camphor, chromous sulfide, diethyl ether, glycerol, hydrogen sulfide, methyl alcohol, naphthalene, peroxyformic acid, phosphorus, potassium hexacyanoferrate, pyridine, selenium, sodium, and turpentine. Chromic acid ignites ethyl alcohol and many hydrocarbons.

Conditions to Avoid: Avoid excess heat and contact with combustible or organic materials.

Hazardous Products of Decomposition: Thermal oxidative decomposition of chromic acid can produce carbon dioxide, smoke, and irritating exic fumes

#### Section 6. Health Hazard Data

Carcinogenicity: The IARC and NTP list chromic acid and other forms of hexavalent (VI) chromium as human carcinogens.

Summary of Risks: Chromic acid is a poison and a powerful irritant to skin, eyes, and respiratory tract. Skin or lung sensitization (allergic reactions) may occur. Exposure can cause dermatitis (skin rash), asthma, pulmonary edema (fluid in lungs), kidney damage, a "chrome hole," or a

perforation of the nasal septum (tissue between nostrils).

Medical Conditions Aggravated by Long-Term Exposure: Any chronic lung or skin condition. Target Organs: Skin, respiratory tract (including nose, throat, airways, and lungs), and kidney.

Primary Entry Routes: Eyes, skin contact, inhalation, and ingestion.

Acute Effects: Inhalation may cause irritation or burning of nose, throat, and air passages, cough, wheezing, and shortness of breath. Higher exposures may cause pulmonary edema (fluid in lungs). Skin exposure may cause dermatitis (skin rash), irritation, burning, itching, redness, and ulceration (skin destruction) which may penetrate. Eye contact can cause irritation, burning, lacrimation (watering), loss of sight and permanent blindness if not removed quickly.

Chronic Effects: Chronic inhalation of excessive levels may cause epistaxis (nosebleed), "chrome holes," nasal congestion, tooth enamel erosion, chest pain, astama (via allergic sensitization), bronchitis, or respiratory tract cancer. Chronic eye exposure may cause conjunctivitis. Skin contact Continue on next page

#### Section 6. Health Hazard Data, continued

can cause irritant or allergic contact dermatitis, or skin ulceration. Chronic systemic absorption could cause liver or kidney damage.

FIRST AID

Eyes: Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Do not let victim rub eyes or keep them tightly shut. Consult a physician immediately

Skin: Rinse with flooding amounts of water for at least 15 min, and wash with a gentle soap. Promptly remove contaminated clothing. For

redness, blistering, or persistent irritation, consult a physician.

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, have that conscious person drink 1 to 2 glasses of water. Do not induce vomiting since this worsens the victim's condition. Do not neutralize this acid.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: After decontamination and neutralization, treatment of acid burns is similar to that of thermal burns, although bullae and loose necrotic tissue should be debrided. Update tetanus status, For severe acid burns, fluid resuscitation is critical to prevent mortality from hypovolemia and renal failure. Monitor serial vital signs, urine output, electrolytes, blood count, and urinalysis as clinically indicated. Neurovascular compromise distal to a circumferential extremity burn may require escharotomy or fasciotomy. For inhalation exposures to acids, a CXR, EKG, ABGs, PFTs, SMA, and CBC may aid in treatment. Evaluate and treat as indicated for reactive airways, upper airway obstruction and noncardiogenic pulmonary edema (possibly delayed onset). Although literature documentation is inadequate, a burst of steroids may help prevent development of sequelae such as reactive airways dysfunction syndrome or bronchilitis obliterans. For ocular exposures to acids, ensure adequate decontamination. Determination of pH may be helpful. A Morgan Lense and topical anesthesia may aid in irrigation. Perform fluorescein staining and slit lamp evaluation and consult an opthamalogist. Antibiotic ointments, mydriatic/cycloplegics, topical corticosteroids (after epithelial recovery), patching, and possibly anterior chamber paracentesis may be indicated depending on clinical presentation. Acutely and in follow-up, evaluate as indicated for intraocular pressure, lacrimal and lid function, corneal integrity and infection. Urinary chromium is of questionable value.

#### Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel and evacuate all unnecessary personnel. Cleanup personnel should protect against dust inhalation and eye contact. Do not handle broken packages unless wearing appropriate personal protective equipment. Keep combustibles (wood, paper, etc.) away from spilled material. Whenever possible, use wet cleanup methods; if not, use vacuum cleanup. Remove spills immediately to prevent dust dispersion. For a water spill, neutralize with agricultural lime, crushed limestone, or sodium bicarbonate. For a land spill, dig a pit, pond, or lagoon to contain material. If time permits, seal these with an impermeable, flexible membrane liner. Dike surface flow with soil, sand or foamed concrete. Follow applicable OSHA regulations (29 CFR 1910.120).

Environmental Transport: If allowed contact with soil, chromic acid, solid, lowers pH and may leach into water sources, causing an effect similar to acid rain's on water sources. This material's carcinogenicity makes it hazardous to the environment in its hexavalent state. Environmental Degradation: The recommended disposal means are reduction, precipitation, or ion exchange. Landfill disposal is not recom-

mended since it raises soil acidity.

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations. EPÀ Designations

Listed as a RCRA Hazardous Waste (40 CFR 261.22): Corrosive waste
RCRA Hazardous Waste (40 CFR 261.33): Not listed
Listed as a CERCLA Hazardous Substance\* (40 CFR 302.4), Reportable Quantity (RQ): 10 lb (4.54 kg) [\*per Clean Water Act, Sec. 311(b)(4)]†
SARA Extremely Hazardous Substance (40 CFR 355): Not listed

ARA Toxic Chemical (40 CFR 372.65): Not listed

**OSHA** Designations

Listed as an Air Contaminant (29 CFR 1910.1000, Tables Z-1-A and Z-2)

Chromic acid (CAS No. 7738-94-5) is listed.

#### Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Respirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. For 0.5-g/m<sup>3</sup> concentrations (if not fumes), use any dust and mist respirator except single-use and quarter-mask respirators. For 1.25-g/m<sup>3</sup> concentrations, use any powered air-purifying respirator with a high-efficiency particulate filter. For 2.5-m/m<sup>3</sup> concentrations, use any air-purifying full facepiece respirator with a high-efficiency particulate filter. For 30-g/m<sup>3</sup> concentrations, use any supplied air respirator with a full facepiece and operated in a pressure-demand or other positive-pressure mode. All concentrations may require eye protection. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. Warning! Airpurifying respirators do not protect workers in oxygen-deficient atmospheres.

Other: Wear impervious gloves, boots, aprons, and gauntlets to prevent skin contact.

Ventilation: Provide general and local ventilation systems to maintain airborne concentrations below occupational exposure levels. Local exhaust ventilation is professed to the contact of the c

ventilation is preferred since it prevents contaminant dispersion into work area by controlling it at its source. (103)
Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities. Contaminated Equipment: Contact lenses may minimize or worsen eye injuries. In some cases, soft lenses can actually protect eyes, not worsen corneal damage, due to strong chemicals. In other cases, chemical entrapment is presumed a possible hazard. Since contact lens use in industry is controversial, establish your own policy. Remove this material from your shoes and equipment. Launder contaminated clothing before wearing. Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

#### Section 9. Special Precautions and Comments

Storage Requirements: Store in glass bottles, cans, or drums. Protect against physical damage. Separate from combustible, organic, or other easily oxidizable materials. Protect from excess moisture which could cause containers to rust. Do not store on wooden floors. Store away from foodstuffs and flammable liquids and solids.

Engineering Controls: Avoid dust inhalation and skin or eye contact. Institute a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Practice good housekeeping procedures.

Other Precautions: Institute preplacement and periodic medical exams of exposed workers with attention to the skin and respiratory tract. Consider preplacement and periodic chest radiographs.

Transportation Data (49 CFR 172.101, .102)

DOT Shipping Name: Chromic acid, solid

DOT Hazard Class: Oxidizer ID No.: NA1463

DOT Label: Oxidizer

DOT Packaging Exceptions: 173.153 DOT Packaging Requirements: 173.164

IMO Shipping Name: Chromium trioxide, anhydrous

IMO Hazard Class: 5.1

ID No.: UN1463

IMO Label: Oxidizer, Corrosive IMDG Packaging Group: II

MSDS Collection References: 26, 38, 73, 85, 100, 101, 103, 124, 126, 127, 132, 133, 136, 138, 139, 140, 143, 142, 145, 148, 159
Prepared by: M Gannon, BA; Industrial Hygiene Review: DJ Wilson, CIH; Medical Review: MJ Upfal, MD, MPH; Edited by: JR Stuart, MS

#### Material Safety Data Sheet

From Genium's Reference Collection Genium Publishing Corporation 1145 Catalyn Street Schenectady, NY 12303-1836 USA (518) 377-8855



No. 175

IRON (III) OXIDE (Revision A)

Issued: February 1986 Revised: November 1987

#### SECTION 1. MATERIAL IDENTIFICATION

Material Name: IRON (III) OXIDE

Description 'Origin/Uses): Used in polishing compounds, pigments, magnetic tape, and metallurgy.

Other Designations: Ferric Oxide; Iron Sesquioxide; Red Iron Oxide; Fe<sub>2</sub>O<sub>3</sub>; NIOSH RTECS No. NO7400000; CAS No. 1309-37-1

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the Chemicalweek Buyer's Guide (Genium ref. 73) for a list of suppliers.

HMIS Not Found

24

F 0 R 1 R 0 I 2 PPG\* S 1

\*See sect. 8 K 0

SECTION 2. INGREDIENTS AND HAZARDS

SECTION 2. INGREDIENTS AND HAZARDS

SECTION 3. INGREDIENTS AND HAZARDS

ACGIH TLVs, 1987-88

TLV-TWA: 5 mg/m³ (Dust and Fume: Total Particulate, as Fe)

OSHA PEL (Iron Oxide Fume)

8-Hr TWA: 10 mg/m³

Toxicity Data\*

Rat, Intraperitoneal, LD, 5500 mg/kg

\*See NIOSH RTECS for additional data.

#### SECTION 3. PHYSICAL DATA

Vapor Pressure: 0 Torr at 68°F (20°C) Specific Gravity (H,O = 1): 5.24

 $\psi_{\rm oghi}$ 

Melting Point: 2849°F (1565°C) Molecular Weight: 160 Grams/Mole

Appearance and Odor: Iron (III) Oxide is a red-brown dust or fume with a metallic taste. The amount of combined water and size of particles determine the exact color and appearance of this material.

SECTION 4. FIRE	AND EXPLOSION DA	TA	LOWER	UPPER
Flash Point and Method	Autoignition Temperature	Flammability Limits in Air		
*	*	% by Volume	•	*

Extinguishing Media: \*Iron (III) Oxide does not burn. Use extinguishing agents suitable for the surrounding fire.

Unusual Fire or Explosion Hazards: None.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressuredemand or positive-pressure mode for protection against the dust, mist, and/or fumes that can occur during fire conditions.

#### SECTION 5. REACTIVITY DATA

Iron (III) Oxide is stable in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization.

Chemical Incompatibilities: Iron (III) Oxide is incompatible with hydrazine, calcium hypochlorite, performic acid, and bromine pentafluoride.

Conditions to Avoid: Avoid generating dusts and/or fumes.

Hazardous Products of Decomposition: None.

#### SECTION 6. HEALTH HAZARD INFORMATION

Iron (III) oxide is not listed as a carcinogen by the IARC, NTP, or OSHA.

Summary of Risks: As a nuisance dust, iron (III) oxide does not produce significant changes in the upper respiratory tract (URT) when exposures to it are kept within reasonable limits. It may cause mechanical irritation of the eyes, skin, and mucous membranes like any other nuisance dust.

Medical Conditions Aggravated by Long-Term Exposure: Existing respiratory ailments may be aggravated by long-term exposure to iron (III) oxide. Periodic physical exams emphasizing pulmonary functions, including chest X rays, are recommended for those with potential long-term exposure. Target Organs: Respiratory system. Primary Entry: Inhalation. Acute Effects: Excessive dust/fume levels produce nonspecific irritation of the eyes and respiratory system. Chronic Effects: Prolonged inhalation (6-10 years) of iron (III) oxide dust/fume may produce siderosis with changes visible on a chest X ray. This benign pneumoconiosis is not associated with pulmonary fibrosis or disability unless there is a concurrent exposure disease. The TLV cited in section 2 "is recommended to prevent the development of X-ray changes in the lung on long-term exposure" (Genium ref. 89).

Eye Contact: Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes. Skin Contact: Wash the affected area with soap and water. Inhalation: Remove victim to fresh air. Ingestion: Never give anything by mouth to someone who is unconscious or convulsing. If the victim is responsive, give him several glasses of water to drink. Induce vomiting by giving him an emetic.

GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES. Seek prompt medical assistance for further treatment, observation, and support after first aid.

#### SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Avoid excessive generation of dust. If dust is generated, wear appropriate respiratory protection (see sect. 8). Ventilate the affected area; carefully scoop or vacuum waste, using an appropriate filter, into a suitable container for reclamation or disposal.

Waste Disposal: Consider reclamation, recycling, or destruction rather than disposal in a landfill. Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

#### OSHA Designations

Air Contaminant (Iron (III) Oxide Fume) (29 CFR 1910.1000, Subpart Z)

EPA Designations (40 CFR 302.4)
RCRA Hazardous Waste: Not Listed
CERCLA Hazardous Substance: Not Listed

#### SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Follow the eye- and face-protection guidelines of 29 CFR 1910.133. Respirator: Use a NIOSH-approved respirator per the NIOSH Pocket Guide to Chemical Hazards (Genium ref. 88) for the maximum-use concentrations and/or the exposure limits cited in section 2. Respirator usage must be in accordance with the OSHA regulations of 29 CFR 1910.134. Other Equipment: Wear impervious gloves, boots, aprons, gauntlets, etc., as required by the specific work environment to prevent excessive skin contact or contamination. Ventilation: Install and operate general and local ventilation systems of sufficient power to maintain airborne levels of iron (III) oxide dust below the OSHA PEL standard cited in section 2. Safety Stations: Make eyewash stations, washing facilities, and safety showers available in areas of use and handling. Contaminated Equipment: Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them. Do not wear contact lenses in any work area. Remove and launder contaminated clothing before wearing it again; clean this material from shoes and equipment.

Comments: Practice good personal hygiene; always wash thoroughly after using this material. Keep this material off of your clothes and equipment. Avoid transferring iron (III) oxide dust from hands to mouth while eating, drinking, or smoking. Do not smoke, eat, or drink in any immediate work area. Do not create dusty conditions!

#### SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage Segregation: Store iron (III) oxide in a cool, dry, well-ventilated area away from chemical incompatibles (see sect. 5).

Special Handling/Storage: Protect containers from physical damage, use with adequate ventilation, do not create dusty conditions, and practice good housekeeping to minimize the accumulation of iron (III) oxide dust.

#### Transportation Data (49 CFR 172.101-2)

Iron (III) oxide is not listed in the shipping regulation tables of 49 CFR 172.101-2.

References: 1, 2, 4, 5, 9, 12, 27, 43, 55, 58, 73, 82-94, 103. CV/PJI

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Approvals PACCAGCO

Indust. Hygiene/Safety

Medical Review

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### Material Safety Data Sheet

from Cenium's Reference Collection Genium Publishing Corporation 1145 Catalyn Street Schenectady, NY 12303-1836 USA (518) 377-8855



No. 360

**FORMALIN** (Revision B)

Issued: March 1981

Revised: November 1988

#### 1. MATERIAL IDENTIFICATION SECTION

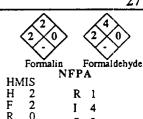
Material Name: FORMALIN

Description (Origin/Uses): Used as a disinfectant; as a germicide and fungicide for plants and vegetables; to destroy flies and other insects; to manufacture phenolic resins (formerly used in home construction but banned in 1982), artificial silks, cellulose esters, dyes, organic chemicals, glass mirrors, and explosives; in improving fastness of dyes in fabrics; tanning and preserving hides; and mordanting and waterproofing fabrics; also used in rubber latex applications and in embalming fluids.

Other Designations: Formal; Formaldehyde Solution; Morbicide

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the Chemicalweek

Buyers' Guide' (Genium ref. 73) for a list of suppliers.



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K 2

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SECTION 2. INGREDIENTS AND HAZARDS	%	EXPOSURE LIMITS
Formaldehyde, * HCHO, CAS No. 0050-00-0	37 to 55	OSHA PELs
Methanol, CAS No. 0067-56-1  *See Comments in section 3.  **Methyl alcohol may be absorbed through intact skin, which contributes to overall exposure.	0 to 15	8-Hr TWA: 1 ppm 15-Min STEL: 2 ppm 8-Hr TWA Action Level: 0.5 ppm ACGIH TLVs, 1988-89 TLV-TWA: 1 ppm, 1.5 mg/m³ TLV-STEL: 2 ppm, 3 mg/m³ OSHA PELs (Skin*) 8-Hr TWA: 200 ppm, 260 mg/m³ 15-Min STEL: 250 ppm, 310 mg/m³ ACGIH TLVs (Skin*), 1988-89
Comments: See NIOSH, RTECS (LP8925000), for toxicity data on both free formaldehyde gas and formaldehyde-in-water solution (formalin); see RTECS (PC1400000) for toxicity data for the methanol stabilizer component of formalin.		TLV-TWA: 200 ppm, 260 mg/m³ TLV-STEL: 250 pm, 310 mg/m³

#### SECTION 3. PHYSICAL DATA

Boiling Point: 205°F (96°C)

Melting Point <32°F (0°C)

Specific Gravity (H<sub>2</sub>O = 1): 1.0 to 1.15

pH: 2.8 to 4.0 (Basic)

% Volatile by Volume: 37 to 55

Appearance and Odor: A clear, water white liquid; with pungent, characteristic, formaldehyde odor (detection level: ca 1 ppm). Comments: Commercial formalin solutions contain varying amounts of formaldehyde gas, methanol, and water. Contact your supplier for the specifications of the purchased product; the physical properties listed are representative values for the common 37%-by-weight formaldehyde-gas-in-water solution containing methanol as a stabilizer.

#### SECTION 4. FIRE AND EXPLOSION DATA

Flash Point: 122°F (50°C)\* Autoignition Temperature: 795°F (424°C), Formaldehyde Gas LEL: 7%\*\* UEL: 73%\*\*

Extinguishing Media: Use dry chemical, carbon dioxide, water spray, or "alcohol" foam to extinguish formalin fires. Use a water spray to cool fire-exposed containers, to flush spills away from sources of ignition, and to dilute spills to nonflammable mixtures. If free formaldehyde gas is burning, direct fire-fighting operations toward stopping the flow of this gas; use a water spray to protect personnel attempting to do so. Unusual Fire or Explosion Hazards: Formalin liquid itself presents a moderate fire and explosion hazard. The formaldehyde gas that can be evolved from work operations is flammable. If the formalin solution is stabilized with methanol, take into account the increased possibility of flammability associated with the methanol vapor. Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

\*\*Mixtures of air and free formaldehyde gas are highly flammable; the wide range of explosibility is from 7 to 73%. Formalin is a combustible liquid. The flash point of a 37% formaldehyde and 0% methanol solution (a "37% methanol-free solution") is 185°F (85°C). The flash point of formalia solutions decreases as the amount of methanol increases.

#### SECTION 5. REACTIVITY DATA

Formalin is stat le during routine use and handling. It cannot undergo hazardous polymerization. Formalin solutions can undergo a nonhazardous self-polymerization to form paraformaldehye, which precipitates out of solution as an undissolved solid at the bottom of the container. Chemical Incompatibilities: Formaldehyde gas reacts dangerously with nitrogen dioxide, perchloric acid and aniline, and performic acid. Atmospheric oxygen can oxidize formaldehyde to form corrosive formic acid, especially when the formalin solution is heated. Strong oxidizing agent; and active organic materials such as phenol may promote unintended accidental polymerization reactions. Conditions to Avoid: Avoid cirect contact with incompatible chemicals or exposure to sources of ignition. Always establish compatibility between formalin solutions and another material by testing small quantities of materials to replicate the expected conditions of bulk operations. Hazardous Products of Decomposition: Toxic gases such as carbon monoxide can be produced during formalin or formaldehyde fires. Warning Formaldehyde can react with hydrogen chloride under certain atmospheric conditions to form bis (chloromethyl) ether, which is widely recognized as a confirmed human carcinogen. Prevent accidental contact between formaldehyde and hydrogen chloride.

<sup>\*</sup>Determined for a formalin solution containing 37% formaldehyde and 15% methanol.

# SECTION 6. HEALTH HAZARD INFORMATION

Carcinogenisity: Formaldehyde is classified by the ACGIH as a group A2 (suspected human) carcinogen; by the IARC as a group 2B (probable human) carcinogen, and by the NTP as a group b (reasonably anticipated) carcinogen. Summary of Risks: Formaldehyde gas is irritating to the eyes, nose, throat, and upper respiratory tract (URT); coughing, difficulty in breathing, pulmonary edema, pneumonitis, and even death can result from inhalation of high concentrations. Skin contact with strong formalin solutions or with formaldehyde gas have caused primary skin irritation. Ingestion of formalin solutions causes corrosive gastritis with a high likelihood of perforation. Severe stomach pain, nausea, vomiting, coma, and even death can result. Approximately 2 ounces constitute a mean lethal dose of 37% formalin. Formalin solutions splashed into the eyes have caused severe injury and corneal damage. Sensitive individuals may develop symptoms from an exposure that is as low as 0.05 ppm. Exposure at 10 to 20 ppm causes profuse tearing, a severe burning sensation, and cough; it can be tolerated for only a few minutes. Medical Conditions Aggravated by Long-Term Exposure: None reported. Target Organs: Skin, eyes, URT. Primary Entry: Inhalation, skin contact. The formalin solution may contain methanol that can be absorbed through the skin. Acute Effects: Irritation of the eyes, skin, and URT. Chronic Effects: Cancer may be caused by chronic exposure to formaldehyde gas. Formalin solutions and resins that contain formaldehyde cause sensitization dermatitis. Sensitization to formaldehyde has been reported following chronic low-level exposures resulting in asthmatic symptoms after minimal exposure. FIRST AID: Eyes. Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes. Skin. Rinse the area with water and then wash it with soap and water. Inhalation. Remove the exposed person to fresh air; restore and/or support his or her breathing as needed. Have qualified medical personnel administer oxygen as required. Ingestion (applicable only to accidental ingestion of formalin solutions, not applicable to formaldehyde gas): Never give anything by mouth to someone who is unconscious or convulsing. Begin immediate dilution with 4 to 8 ounces of water or milk. Get medical help (in plant paramedic, community) for all exposures. Seek prompt medical assistance for further treatment, observation, and support after first aid. Note to physician: Severe inhalation exposures (ca 50 ppm) may cause pulmonary edema. Treatment for accidental ingestion includes a gastric lavage with water or saline until clear, followed by activated charcoal with saline or sorbital catharsis. Treat exposed person for anion-gap acidosis; monitor blood methanol levels concurrently. The rapidly metabolized formic acid requires attention: treat for acidosis and use dialysis to remove the formic acid.

# SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel, eliminate all sources of ignition, provide adequate ventilation, and evacuate all nonessential personnel. Cleanup personnel need protection against skin contact with the liquid and inhalation of its vapor (see sect. 8). Contain large spills and collect waste. Neutralize the spilled formalin with aqueous ammonia or mix it with sodium sulfite. Wash the residues with dilute ammonia to eliminate vapor. Prevent runoff from entering streams, surface waters, waterways, watersheds, and sewers. Preplan for emergency response. Waste Disposal: Consider reclamation, recycling, or destruction rather than disposal in a landfill. Waste formalin can be burned in an approved incinerator. Approved landfills may accept properly neutralized formalin solutions. Follow Federal, state, and local regulations.

OSHA Designations

Listed as a specifically regulated substance (29 CFR 1910.1028).

EPA Designations (40 CFR 302.4)

RCRA Hazardous Waste, No. U122

CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg), per the Clean Water Act (CWA), Section 311 (b) (4), and the Resource Conservation and Recovery Act (RCRA), Section 3001.

#### SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Where splashing of formalin solutions is possible, wear a full face shield. Follow OSHA eye- and face-protection regulations (29 CFR 1910.133). Respirator: Wear a NIOSH-approved respirator per Genium reference 88 for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine operations (spills or cleaning reactor vessels and storage tanks), wear an SCBA. Warning: Airpurifying respirators will not protect workers in oxygen-deficient atmospheres. Other: Wear impervious nitrile, butyl rubber, or Viton gloves, boots, aprons, and gauntlets, etc., to prevent excessive or prolonged skin contact. Ventilation: Install and operate general and local exhaust-ventilation systems powerful enough to maintain airborne levels of formaldehyde below the OSHA PEL standard cited in section 2. Design all ventilation systems to be explosion proof in order to minimize sources of ignition. These recommendations apply to work areas where either formaldehyde gas or formalin solutions are used. Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work areas. Contaminated Equipment: Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them. Do not wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from shoes and equipment. Other: Design all engineering systems in a manner that minimizes sources of ignition such as open flame, uninsulated heaters, etc. Electrically ground and bond all containers and equipment used in shipping, receiving, manufacturing, and sampling operations that involve formaldehyde or formalin to prevent static sparks that could start a fire or explosion. Comments: Practice good personal hygiene; always wash thoroughly after using this material. Avoid transferring it from

## SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage/Segregation: Store formalin solutions in insulated, closed containers in a cool, dry, well-ventilated area separate from oxidizing agents and alkaline materials. The minimum storage temperature required to prevent polymerization reactions and subsequent degradation of the formalin product ranges from 83°F (28°C, or 37% formalin containing 0.05% methanol), to 29°F (-2°C, or 37% formalin containing 15% methanol). Special Handling/Storage: Control the inventory of formalin solutions. Protect formalin containers from physical damage. Before using this material in bulk operations, test a small quantity of it to ascertain its quality. Engineering Controls: Follow established safety procedures during transfers of formalin. Comments: Train personnel who work with formaldehyde in its safe use and in proper emergency response. Remove from further exposure any worker who exhibits signs of skin-sensitization reactions.

Transportation Data (49 CFR 172.101-2)\*

DOT Shipping Name: Formaldehyde Solutions DOT Class: ORM-A or Combustible Liquid

DOT Label: None ID NOs. UN1198 or UN2209

\*Formalin solutions vary in their flash points and the capacity of their shipping containers; the DOT regulations vary accordingly. References: 1, 2, 26, 38, 84, 86-94, 100, 112, 113, 114, 116, 117, 120, 122.

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Prepared by PJ Igoe, BS

Industrial Hygiene Review: DJ Wilson, CIH

Medical Review: MJ Hardies, MD; W Silverman, MD

# Material Safety Data Sheet

from Genium's Reference Collection Genium Publishing Corporation 1145 Catalyn Street Schenectady, NY 12303-1836 USA (518) 377-8855



No. 683

POLYCHLORINATED BIPHENYLS (PCBs)

27

Issued: November 1988

# SECTION 1. MATERIAL IDENTIFICATION

Material Name: POLYCHLORINATED BIPHENYLS (PCBs)

Description (Origin/Uses): Commercial PCBs are mixtures that were once widely manufactured by combining chlorine gas, iron filings, and biphenyls. Their high stability contributes to their intended commercial applications and their accidental, long-term adverse environmental and health effects. PCBs are useful as insulators in electrical equipment because they are electrically nonconductive. Their distribution has been limited since 1976. The Aroclor PCB codes identify PCBs by type. The first two digits of a code indicate whether the PCB contains chlorinated biphenyls (12), chlorinated terphenyls, (54), or both (25, 44); the last two digits indicate the approximate percentage of chlorine. Found in insulating liquid, synthetic rubber, plasticizers, flame retarlants, floor tile, printer's ink, paper and fabric coatings, brake linings, paints, automobile body scalants, asphalt, adhesives, electrical capacitors, electrical transformers, vacuum pumps, gas-transmission turbines, heat-transfer fluids, hydraulic fluids, lubricating and cutting oil, copying paper, carbonless copying paper, and fluorescent light ballasts.

Synonym: Chlorodiphenyls

A tare

Other Des gnations (Producer, Trade Name, Nation): Monsanto, Aroclor<sup>®</sup> (USA, Great Britain); Bayer, Clophen<sup>®</sup> (German Democratic Republic): Prodelec, Phenoclor<sup>®</sup>, Pyralene<sup>®</sup> (France); Kanegafuchi, Kanechlor<sup>®</sup>; Mitsubishi, Santotherm<sup>®</sup> (Japan); Caffaro, Fenclor<sup>®</sup> (Italy).

Trade Name	CAS No.	RTECS No.	Trade Name	CAS No.	RTECS No.	HMIS	
Aroclors	01336-36-3	TQ1350000	Aroclor 1242	53469-21-9	TQ1356000	H 1	Rl
Aroclor 1016						F 1	I 3
Aroclor 1221	11104-28-2	TQ1352000	Aroclor 1254	11097-69-1	TQ1360000	R 0	S 1
Aroclor 1232	11141-16-5	TQ1354000	Aroclor 1260	11096-82-5	TQ1362000	PPG*	K 1

# SECTION 2. INGREDIENTS AND HAZARDS/EXPOSURE LIMITS

PCB-42% Chlorine/Aroclor 1242 CAS No. 53469-21-9 OSHA PEL (Skin\*) 8-Hr TWA: 1 mg/m<sup>3</sup>

ACGIH TLV (Skin\*), 1988-89

TLV TWA: 1 mg/m<sup>3</sup>

PCB-54% Chlorine/Aroclor 1254 CAS No. 11097-69-1 OSHA PEL (Skin\*)

8-Hr TWA: 0.5 mg/m<sup>3</sup> ACGIH TLV (Skin\*), 1988-89

TLV-TWA: 0.5 mg/m<sup>3</sup>

All PCBs/Aroclors CAS No. 1336-36-3 NIOSH REL 1977

10-Hour TWA: 0.001 mg/m<sup>3</sup>

Toxicity Data\*\*

Mouse, Oral, LD<sub>so</sub>: 1900 mg/kg

\*This material can be absorbed through intact skin, which contributes to overall exposure.

\*\*See NIOSH, RTECS (Genium ref. 90), at the locations specified in section 1 for additional data with references to tumorigenic, reproductive, mutagenic, and irritative effects.

# SECTION 3. PHYSICAL DATA

Boiling Point: Ranges from 527°F (275°C) to 725°F (385°C)

Solubility in Water (%): Insoluble

Pour Point: Ranges from -31°F (-35°C) to 87.8°F (31°C)

% Volatile by Volume: Ranges from 1.2 to 1.6

Molecular Weight (Average): Aroclor 1242: 258 Grams/Mole

Aroclor 1254: 326 Grams/Mole

Appearance and Odor: Clear to light yellow mobile oil to a sticky resin; a sweet "aromatic" odor. As the percentage of chlorine increases, the PCB becomes thicker and heavier; e.g., Aroclor 1254 is more viscous than Aroclor 1242.

# SECTION 4. FIRE AND EXPLOSION DATA

Flash Point\* Autoignition Temperature: Not Found LEL: Not Found UEL: Not Found

Extinguishing Media: Use water spray/fog, carbon dioxide (CO<sub>2</sub>), dry chemical, or "alcohol" foam to extinguish fires that involve polychlorinated biphenyls. Although it is very difficult to ignite PCBs, they are often mixed with more flammable materials (oils, solvents, etc.) Unusual Fire or Explosion Hazards: If a transformer containing PCBs is involved in a fire, its owner may be required to report the incident to appropriate authorities. Consult and follow all pertinent Federal, state, and local regulations. Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode; fire fighters must also wear a complete set of protective clothing. Comments: The hazards of PCB fires are associated with the possibility of their being released into the environment where they and their products of degeneration can pose serious long-term health risks. These potential problems are heightened by the PCBs' resistance to biological and chemical degradation and by the possibility that they will contaminate underground water systems (see sect. 5)

\*Ranges from 284°F (140°C) to 392°F (200°C).

## SECTION 5. REACTIVITY DATA

Stability/Polymerization: Polychlorinated biphenyls are very stable materials. Hazardous polymerization cannot occur. Chemical Incompatibilities: PCBs can react dangerously with sodium or potassium. These reactions are part of an industrial process used to destroy FCBs; however, people have been killed by explosions at PCB treatment, storage, and disposal sites. Conditions to Avoid: Limit human exposure to PCBs to the lowest possible level; especially avoid contact with skin. Hazardous Products of Decomposition: Thermal-oxidative degradation of PCBs can produce toxic gases such as carbon monoxide, chlorine, chlorinated aromatic fragments, phenolics, aldehydes, and hydrogen chloride. Incomplete combustion of PCBs produces toxic compounds such as polychlorinated dibenzofuran (PCDF, the major product of combustion), and polychlorinated dibenzo-p-dioxin (PCDD or dioxin).

# SECTION 6. HEALTH HAZARD INFORMATION

Carcinogenicity: The EPA lists PCBs as carcinogens, and the IARC classifies them as probable human carcinogens (group 2B). Summary of Risks: Effects of accidental exposure to PCBs include acneform eruptions; eye discharge; swelling of the upper eyelids and hyperemia of the conjunctiva; hyperpigmentation of skin, nails, and mucous membrane; chloroacne; distinctive hair follicles; fever; hearing difficulties; limb spasms; headache; vomiting; and diarrhea. PCBs are potent liver toxins that can be absorbed through unbroken skin in hazardous amounts without immediately discernible pain or discomfort. Severe health effects can develop later. In experimental animals, prolonged or repeated exposure to PCBs by any route results in liver damage at levels that are less than those reported to have caused cancer in rodents. Medical Conditions Aggravated by Long-Term Exposure: None reported. Target Organs: Skin, eyes, eyelids, blood, liver. Primary Entry: Inhalation, skin contact/absorption. Acute Effects: Skin and eye irritation, acneform dermatitis, nausea, vomiting, abdominal pain, jaundice, liver damage. Chronic Effects: Possible cancer (evidence of this is inconclusive); reproductive effects (jaundice, excessive secretion of tears, dermal chromopexy); and hepatitis. FIRST AID: Eyes. Immediately flush eyes, including under the eyelids, gently but thoroughly with flooding amounts of running water for 15 minutes. Skin. Rinse exposed skin with flooding amounts of water; wash with soap and water. Inhalation. Remove the exposed person to fresh air; restore and/or support breathing as needed. Have qualified medical personnel administer oxygen as required. Ingestion. Induce vomiting by sticking your finger to the back of the exposed person's throat. Have him or her drink 1 to 2 glasses of milk or water. Get medical help (in plant, paramedic, community) for all exposures. Seek prompt medical assistance for further treatment, observation, and support after first aid. Note to Physician: PCBs are poorly metabolized, soluble in lipids, and they accumulate in tissues or organs rich in lipids. Liver function tests can help to determine the extent of body damage in exposed persons. If electrical equipment containing PCBs arcs over, the PCBs or other hydrocarbon dielectric fluids may decompose and give off hydrochloric acid (HCl), a potent respiratory irritant.

# SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Treat any accidental release of PCBs as an emergency. An SPCCP (spill-prevention control and countermeasure plan) must be formulated before spills or leaks occur. PCBs are resistant to biodegradation, soluble in lipids, and chemically stable; as such they have become significant contaminants of global ecosystems. Releases of PCBs require immediate, competent, professional response from trained personnel. Each release situation is unique and requires a specifically designed cleanup response. General recommendations include adhering to Federal regulations (40 CFR Part 761). Notify safety personnel, evacuate nonessential personnel, ventilate the spill area, and contain the PCBs. All wastes, residues, and contaminated cleanup equipment from the incident are subject to EPA requirements (40 CFR 761). Consult your attorney or appropriate regulatory officials for information about reporting requirements and disposal procedures. Waste Disposal: Contact your hazardous waste disposal firm or a licensed contractor for detailed recommendations, especially when PCBs are unexpectedly discovered. Follow Federal, state, and local regulations. PCBs are biomagnified in the food chain; i.e., their concentration increases at each link. The disposal of PCBs or of PCB-contaminated materials is strictly regulated; violations of applicable laws can result in fines, lawsuits, and negative publicity. Warning: Accidental spills of PCBs that may affect water supplies must be reported to Coast Guard personnel at the National Response Center, telephone (202) 426-2675.

**OSHA** Designations

Listed as an Air Contaminant (29 CFR 1910.1000 Subpart Z).

EPA Designations (40 CFR 302.4)

CERCLA Hazardous Substance, Reportable Quantity: 10 lbs (4.54 kg), per the Clean Water Act (CWA), §§ 311 (b) (4) and 307 (a).

#### SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Where splashing of PCBs is possible, wear a full face shield. Follow OSHA eye- and face-protections regulations (29 CFR 1910.133). Respirator: Wear a NIOSH-approved respirator per Genium reference 88 for the maximum-use concentrations and/or exposure limits cited in section 2. Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine operations (leaks or cleaning reactor vessels and storage tanks), wear an SCBA. Warning: Airpurifying respirators will not protect workers in oxygen-deficient atmospheres. Other: Wear impervious gloves, boots, aprons, and gauntlets, etc., to prevent any contact of PCBs with your skin. Ventilation: Install and operate general and local maximum, explosion-proof ventilation systems powerful enough to maintain airborne levels of this material below the OSHA PEL standards cited in section 2. Local exhaust ventilation is preferred because it prevents dispersion of the contamination into the general work area by eliminating it at its source. Consult the latest edition of Genium reference 103 for detailed recommendations. Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work areas. Contaminated Equipment: Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them. Do not wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from your shoes and equipment. Heavily soiled clothing must be properly discarded in a manner consistent with applicable regulations. Comments: Practice good personal hygiene; always wash thoroughly after using this material and before eating, drinking, smoking, using the toilet, or applying cosmetics. Keep it off your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do not eat, drink, or smoke in work areas.

## SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage Segregation: Store PCBs in closed containers in a cool, dry, well-ventilated area. Protect containers from physical damage. Special Handling/Storage: All storage facilities must have adequate containment systems (dikes; elevated, nonporous holding platforms; retaining walls) to prevent any major release of PCBs into the environment. Carefully design and implement these extra precautions now; do not wait until you have to respond to an accidental release of this material.

Transportation Data (49 CFR 172.101-2; PCBs were the first materials to be directly regulated by Congress by way of TSCA in 1976.)

DOT Shipping Name: Polychlorinated Biphenyls

DOT Hazard Class: ORM-E

ID No. UN 23115

DOT Packaging Requirements: 49 CFR 173.510

IMO Hazard Class: 9

IMDG Packaging Group: II

IMO Shipping Name: Polychlorinated Biphenyls

References: 1, 6, 26, 38, 84-94, 100, 101, 116, 117, 120, 122.

Prepared by PJ Igoe, BS; Industrial Hygiene Review: DJ Wilson, CIH; Medical Review: W Silverman, MD

Technical Review: Northeast Analytical, Inc. (PCB and VOC Specialists), Schenectady, New York, Telephone: (518) 346-4592

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# APPENDIX E

# HEALTH AND SAFETY PLAN SUPPLEMENTS

Appendix F
Acknowledgement Form

# HEALTH AND SAFETY PLAN ACKNOWLEDGEMENT FORM

		<u> </u>
Robert 7. Thomas	7-31-00	Rely & Shonn
Print Name & Company	Date	Signature
John Hudnall	8-(-00 Date	John Hudnall
Print Name & Company	Date	Signature
duse docens	8-1-00	we was
Print Name & Company	Date	Signature
Michael Brooks	8-1-00	Muchael Brooks
Print Name & Company	Date	Signature
Print Name & Company	8.1.00 .	RVIT
C. CEBAN	Date 8/1/00	Signature /
Print Name & Company	Date	Signature
		Signature /
Chery L. Ellist Et E Print Name & Company	<u>B/3/ 00</u> Date	Signature
- •	8/3/00	D. Pa
Print Name & Company	Date	Signature
KACH, WA CKENDINEET	2/7/00	Bulling Alling
Print Name & Company	Date	Signature
Jim Robinson ETRS	8-25-00	Ois Polaria
Print Name & Company	Date	Signature
Shane Bown ETRS	8-25-00	Man Bro
Print Name & Company	Date	Signature
Ryan Rosser E+E	8-25-00	Kapa Floor
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KOBELT MCKINNEY ETRS	08-25-00	That Mil
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Bill Robinson	09-19-00 Date	Cignotura
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Micke Gross Print Name & Company	9/14/00 Date	Signature
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Print Name & Company	9-20-01 Date	Signature Signature
Print Name & Company	9/20/00 Date	Signature
HOWIED BOWERS Print Name & Company	9-70-0C Date	Signature
Paul THAIRM TCI	9-20 - 00	Jan June
Print Name & Company	Date 9/20/00	Signature
Print Name & Company	Date	Signature
JEEL OLIVE	9/20/00	Jali D. Hi
Print Name & Company	Date	Signature
Print Name & Company	$\frac{9/22/00}{\text{Date}}$	Signature
KEITH RRED EPS	/ /	Juth R Reco
Print Name & Company	Date	Signature
Print Name & Company	9-22-00 Date	Signature

Print Name & Company 9.22.2000 Date ignature Biandy Fowler/Earth Tech Print Narre & Company 9-25-00 9-25-00 Denois RANDS ONSITE
Print Name & Company Signature Scott CARMAN USCOLANT Print Name & Company Scutt Kla 10-3-00 Date Print Name & Company 10 - 3 - 00 Date 10 - 16 - 00 Date Print Name & Company Chris Imar 10-16-00 Print Name & Company Signature Print Name & Company 16-16-00 Date 130h Mosser Print Name & Company 10-16-00 Date Print Name & Company 10-16-00 Date /0-16-00 Date Henry RThompson E.P.S. Print Name & Company 10-16-00 Date Print Name & Company JEITER Rerd 16-16-60 Date Print Name & Company Print Name & Company 10 -19-00 Date Frin Name & Company 10-19-00 Date Print Wallie & Signature

ajj P

JEFFREY A. BOWLAND	16-24-00	Chillren a. Brevlor
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# **Table: 9 Emergency Contacts**

**EMERGENCY COORDINATORS** 

Names Title/Workstation Phone

Thomas Cook OSC (740) 284-1723 (site)

Charlie Keegan RM/Primary Coordinator NON- RESPONSIVE Earth Tech (740) 284-1515 (site)

**EARTH TECH OFFICIALS** 

Bob Koentop Program Manager NON-RESPONSIVE NON-RESPONSIVE

Dale Prokopchak Health and Safety Director NON-RESPONSIVE

Jeff Grant Health and Safety Manager (800) 688-9828

NON- RESPONSIVE

Ron Partilla Health and Safety (800) 688-9828

NOŃ- RESPONSIVE

**Pager** 

Marty Lalick Health and Safety (800) 688-9828

NON- RESPONSIVE

Organization/Agency Phone

Police 911
Fire Department 911
State Police 911
Ambulance Service (EMT will determine appropriate hospital for treatment) 911

Trinity Medical Center West 740-264-8000

4000 Johnson Road
St. Johns Heights
Staubonville, Obje (See Fig.

Chair.

Steubenville, Ohio (See Figures 2)

# NOTE: HOSPITAL ROUTE MAY SHOW SIGNS FOR TRINITY MEDICAL CENTER EAST – DO NOT USE THIS FACILITY AS IT IS AN 8AM TO 5PM FACILITY NOT A HOSPITAL EMERGENCY ROOM.

 Poison Control Center
 (800) 632-2727

 Pollution Emergency
 (800) 292-4706

 National Response Center
 (800) 424-8802

 Chem-Tree
 (800) 424-9300

 Title 3 Hot ine
 (800) 535-0202

